

SEPTEMBER 1961

ROCK

PRODUCTS

JUMP
PROFITS
WITH
BETTER
MAINTENANCE

page 86



More efficient CRUSHING AT LOWEST COST for labor, power and upkeep with WILLIAMS REVERSIBLE IMPACTOR



REVERSIBLE ROTATION prolongs parts life without manual adjustment. A simple reversing switch on motor does it.

INTERIOR VIEW of small Impactor shows typical rugged hammers, impact blocks and liners made of manganese steel and other alloys. Rotor removable without disturbing feed or other mechanisms.



For secondary crushing, the economy and high production of a Williams Reversible Impactor is unequalled, whether raw material is hard and abrasive or soft and friable. Precision control of specified top-size is easy, usually in a closed circuit system, from a coarse 2" with minimum fines, down to 35 mesh or finer.

The Impactor has no grates. Material fed into the mill is reduced to proper size while rebounding between the whirling hammers and impact blocks, until discharged from bottom opening. Grinding or rubbing action is eliminated—power, replacement parts and downtime are reduced to a minimum. No fine adjustments need be maintained.

Reversible rotation is a prime feature of the Williams. So is Wide Open Accessibility to interior. So are the Interchangeable Impact Blocks to balance wear. So are the many other exclusives that hold cost-per-ton to the very lowest. There is a size and model for your exact needs. Write for catalog.

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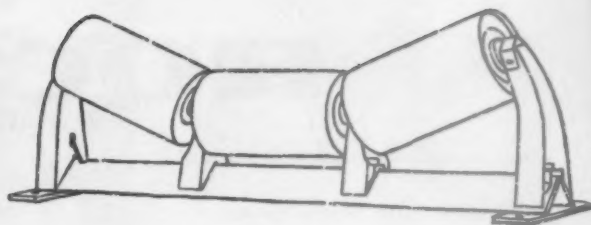
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CRUSHERS GRINDERS SHREDDERS
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A design engineer notes
how Link-Belt idlers

trim belt conveyor maintenance costs



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Machined "seats" for bearings and seals assure perfect alignment in heavy-gauge center tube.

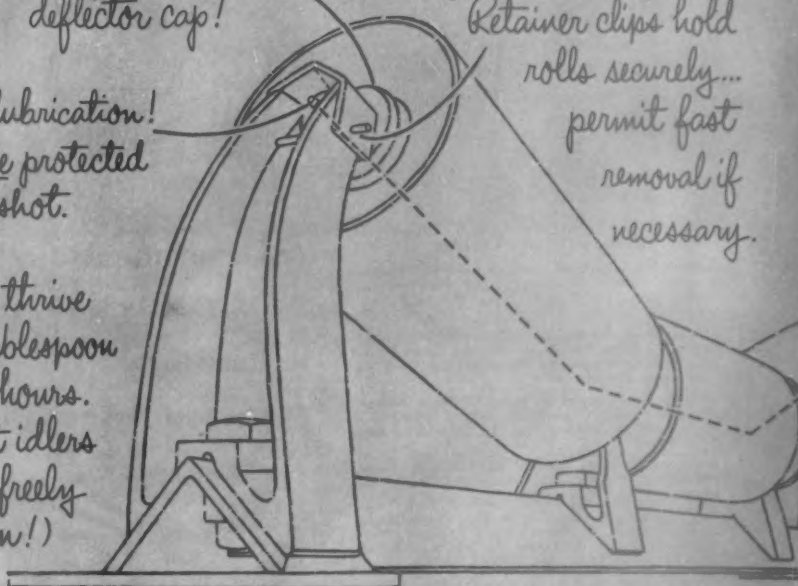
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removal if
necessary.*

*Grease-through lubrication!
Fast, through one protected
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PRODUCTS

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September 1961

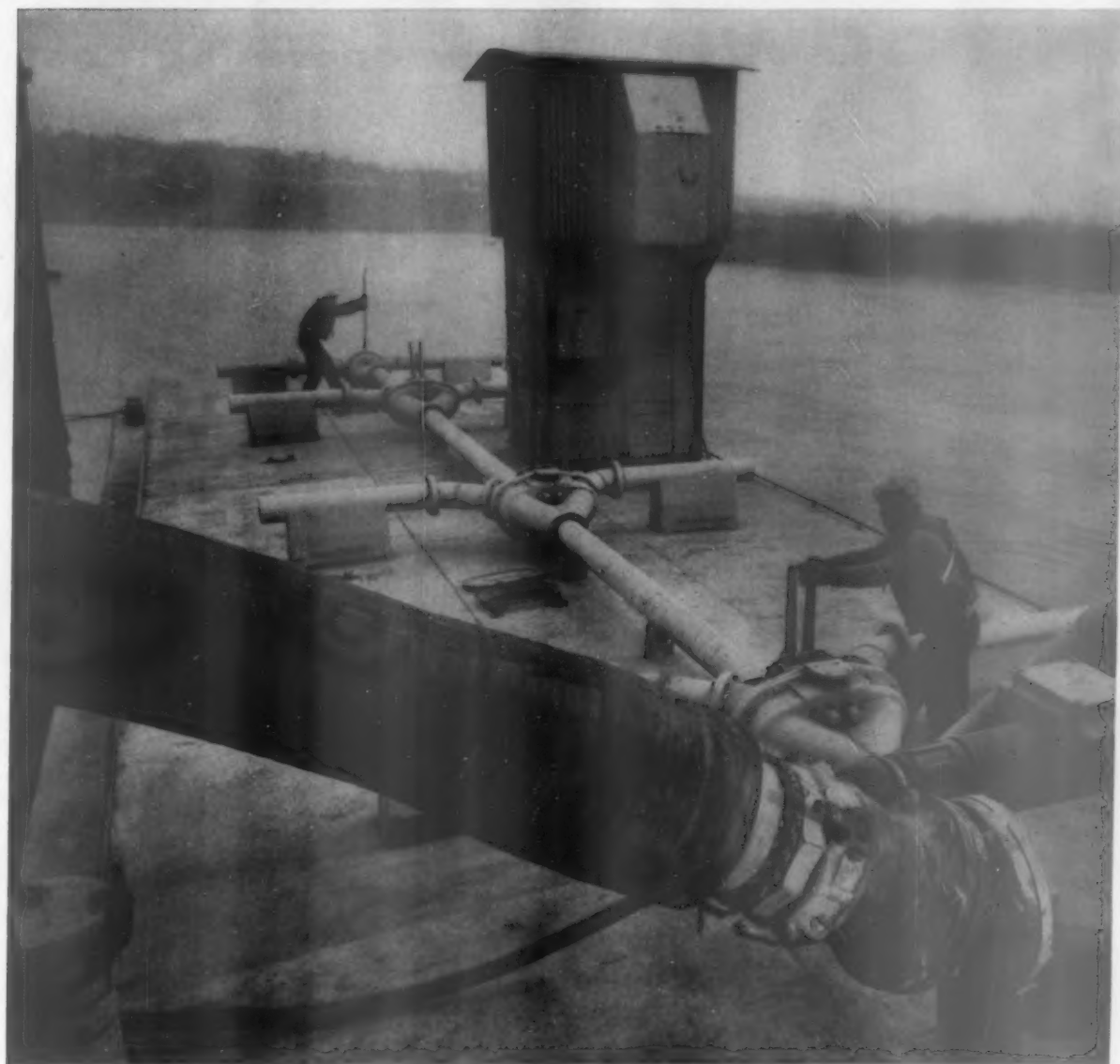
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Hot cement piped aboard barge

Fast handling of bulk cement gets big assist from B.F. Goodrich hose

It's down the hatch—at a 10-barrel-a-minute clip—as dry cement roars through that hose and pours into an Ohio River barge. Works like a charm now, but at first there was a hitch.

The cement is still about 200 degrees hot from processing. And the friction of the sharp, gritty particles whooshing through the hose creates a sand-blasting action. This heat and abrasion were enough to ruin a special wire-reinforced hose in only two months.

When a B.F. Goodrich distributor heard about the problem, he recommended a BFG hose made with a

special lining of the toughest wear-resisting rubber known. This rubber is soft enough so the abrasive stuff simply bounces off the rubber instead of digging in and cutting it to shreds. Hose with this lining has even been used in some places to carry broken glass.

The B.F. Goodrich hose was put to work on the dock, and is still on the job after 15 months and a half-million barrels of cement. It works so well that the company is also using it to unload the barge at distribution terminals along the river.

Your B.F. Goodrich distributor has full information on the hose described here. And, as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F. Goodrich makes for industry. *B.F. Goodrich Industrial Products Co., Dept. M-158, Akron 18, Ohio.*



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Displacement, Cu In	138	149	226
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Making **LITTLE ONES** out of **BIG ONES!**



ONE of the chief problems that Superior Stone Company of Raleigh, North Carolina, faced at King Mountain was that of loading on four levels. Making little ones for the shovel to handle out of big ones called for an 8000 lb. drop ball — moving a crawler rig from level to level was obviously not practical.

Superior solved the problem with a Northwest 35-ton Wagon Crane. Its high stability let it handle the drop ball without setting outriggers. It easily changed position on location, and extreme mobility permitted movement from one level to another in a matter of minutes.

This is a high production operation that requires the maximum utilization of equipment. The Northwest Wagon Crane keeps the rock face and floor clean and level, making shovel operation easier, safer and more profitable.

Superior Stone Company is an old Northwest user. The machine pictured is the 77th Northwest they have bought. There is no better guarantee of the kind of profitable performance you will get if you put a Northwest on *your* job.

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Capacity

CRANES

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Capacity

TRUCK CRANES

25-Ton and 45-Ton
Capacity

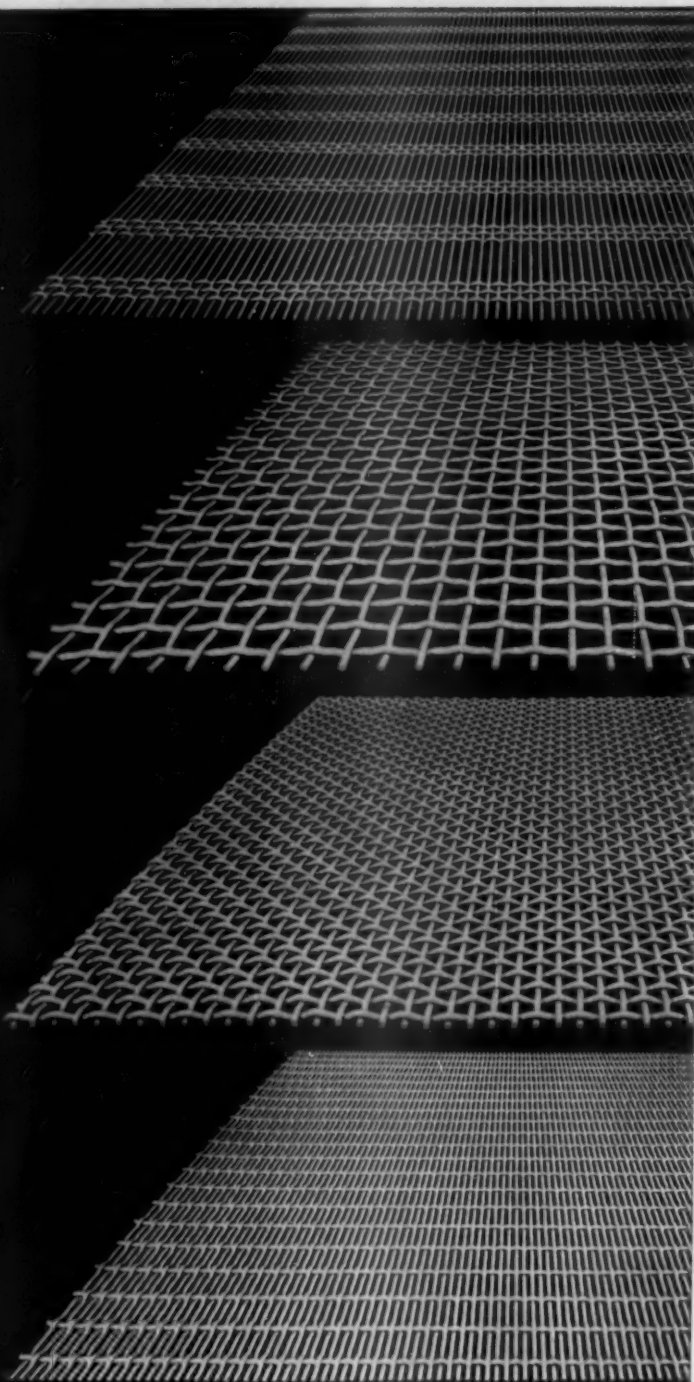
DRAGLINES

¾ Yd. to 3 Yd.
Capacity

¾ to 3
Cubic Yard Capacity

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**Biggest primary gyratory crusher in 1919 and now . . .
big reason why it pays
to plan with Traylor in the changing 60's**

Industry seeking a crusher of capacity bigger-than-ever turned to Traylor and got it . . . 42 years ago. The 60-inch primary gyratory first built by Traylor then is still in operation—along with two others purchased since by the same customer. It is still the standard by which "big" crushers are measured.

Why so important now? One obvious

reason is, no one has a longer record of experience in this special field.

Of even greater importance: It's one of many important demonstrations of Traylor's being first with new and better equipment to meet changing production needs. You'll find many other examples throughout the industry—very likely right in your own plant. Do you use an all-welded kiln . . . a large ball mill, larger copper converter? All these are

Traylor "firsts," too. Traylor's proved capacity to pioneer sound innovations in kilns, mills and crushers is enhanced today by expanded research capabilities and process know-how.

An impressive record of historic "first" . . . plus what it takes to stay first for so many years . . . that's why it pays to call on Traylor first when you're planning plant improvements for bigger profits tomorrow.



See Pit and Quarry Handbook for details and specifications

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ROCK PRODUCTS, September, 1961

7

Crush more tons per dollar . . .

BUY REPLACEMENT PARTS FROM THE COMPANY THAT BUILT YOUR CRUSHER

You buy a crusher because of the engineering experience the manufacturer has put into it to give you more production for your money. In the same way, the manufacturer of your crusher buys the experience and engineering abilities of the company which supplies certain components and replacement parts for it. The manufacturer profits only when *you* are satisfied with the performance of his product. That's why most big-name crushing equipment manufacturers work closely with AMSCO to give you replacement parts that fit perfectly, assure original equipment performance, and last a long time in the toughest conditions.

When it comes to wear parts, here's why most manufacturers insist on AMSCO. As long-experienced specialists in wear-resistant metals, AMSCO engineers alloys to exact formula needed to stand up under the abrasion-impact-pressure crushing conditions of your job. AMSCO cast parts are structurally perfect and contain the proper alloys for longest possible life.

AMSCO parts are patterned from manufacturer's drawings. They are built for *your* crusher . . . not copied from inaccurate field measurements. When you need mantles, concaves, jaws, rolls, plates or liners, get them from the manufacturer who built your crusher. He depends on AMSCO's experienced way with wear-resistant alloys to *help you crush more tons per dollar.*

They're backed by experience...

AMSCO

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILLINOIS

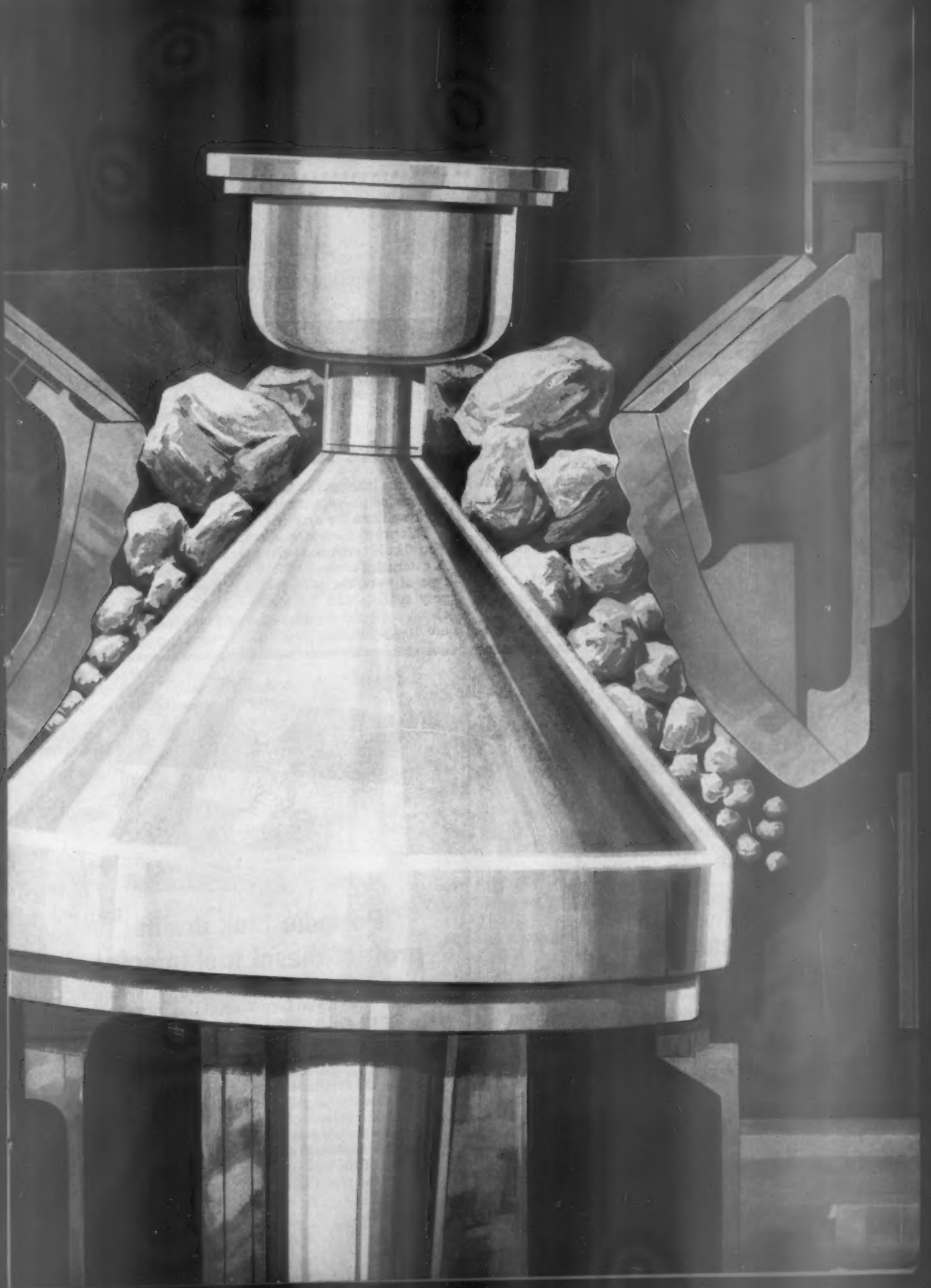
AMERICAN

Brake Shoe

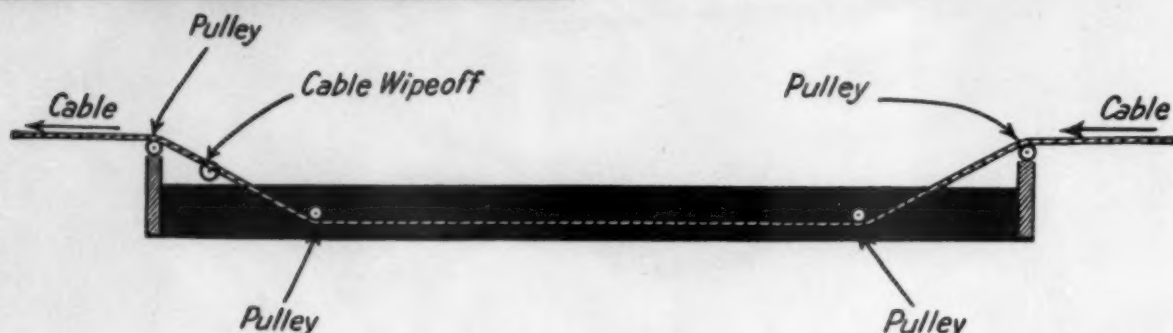
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LUBE LOGIC 5 new ways



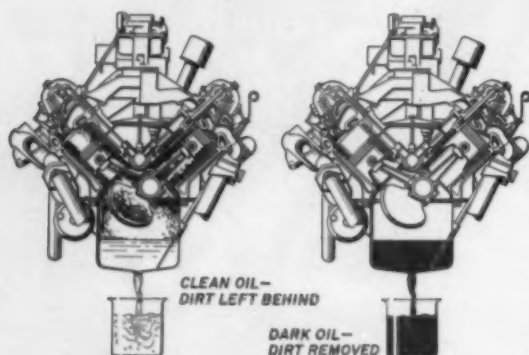
Warm bath restores wire rope

The best way to get lubricant inside a cable, where it's really needed, is to immerse the cable or wire rope every 500 hours or so in a bath of warmed-up Texaco Crater A lubricant. It pays off by giving you far longer service life than you would get simply by applying Crater A externally.

This warm-bath treatment requires a horizontal trough to hold the lubricant. The trough should be fitted with pulleys to keep the cable completely submerged while it's passing through. A burlap collar should be rigged to wipe

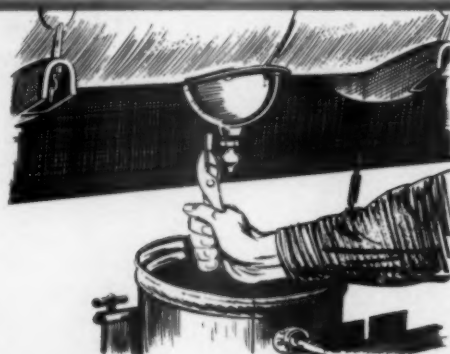
off excess lubricant as the cable leaves the box. An immersion of about a minute will allow the lubricant to work well into the strands.

This process is *not* an alternative to other lubrication. You should continue to clean the cable and apply Crater A externally every 10 to 100 hours, depending on the type of work the cable is doing. Remember also to be very sparing with lubricants on cables that wind on clutch-equipped drums, and never lubricate cables that are dragged in dirt.



Dark engine oil... sign of a hard worker

Here's a motor-oil misconception that's still common enough to need discussion. Some folks think that the better an engine oil is, the more likely it is to come out as clean as it went in. The truth of the matter is just the other way around. A good detergent-dispersant oil holds onto dirt like an old friend. It keeps dust, soot and carbon in suspension, and carries it out of the engine when you drain the oil. Oil that looks clean when you drain it from the crankcase is a sign that these contaminants may still be inside the engine. Moral: oil that darkens in use is really doing its job.



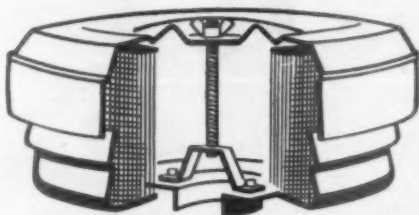
Periodic tank drains protect diesel fuel injector

Dirt and water in diesel fuel can ruin a fuel injector in no time. Even if you keep the fuel clean during storage, there's still a chance that temperature changes will create enough condensate in the fuel tank on your rig to start rusting in the injector. Several operators have pretty well solved this problem by partially draining the fuel tank once or twice a week. Simply draw off about a gallon of fluid through the drain valve at the bottom of the fuel tank. You lose some fuel this way, but you also get the accumulated water and other contaminants clear out of the fuel system. The cost of the fuel you drain off is a small loss compared to the repair bills on the fuel injector.

to trim downtime

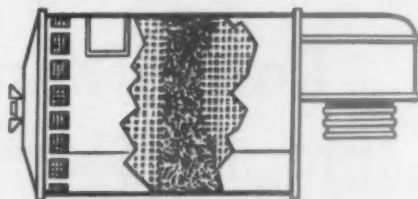
Key points on air filter maintenance

In a day's operation a typical engine inhales several thousand cubic feet of air, and on a construction project all that air is probably loaded with abrasive dirt and dust. Good air-filter maintenance is the only way to make sure your engine gets the air and *not* the dirt. Here are some maintenance tips that will keep your air filter working better through thick and thin.

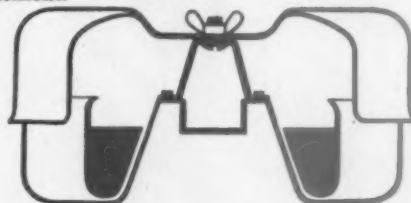


Dry type air cleaners (the ones with the fluted paper element) should simply be shaken or tapped lightly to remove dirt, and reinstalled. Never clean dry-type elements with kerosine or diesel fuel.

Additional precautions: empty centrifugal pre-cleaners when the glass container is half full; don't remove the oil cup when the engine is running.



If your filter is the **wire gauze type**, and you want to re-use the element, wash the gauze in kerosine or diesel fuel, shake it dry (*don't* blow it with compressed air) and re-oil it with SAE 40 or SAE 50 oil to coat the element.



Oil-bath type air filters won't function properly if there's more than a half inch of sediment at the bottom of the oil reservoir. Check the sediment level by sticking a screw-driver down into the oil, and if you're anywhere near the half-inch level the bowl should be cleaned out and refilled. Also, inspect the filter every 5 to 50 hours to make sure the oil itself is at the right level. Every 500 hours the whole cleaner should be dismantled and cleaned, and refilled with new engine oil of the same grade used in the crankcase.

New Texaco movie can help boost your profits



This factual, down-to-earth presentation shows you how 1% of your total budget (the amount usually spent on lubricants) can minimize a major cause of equipment downtime.

SEE: How the biggest engineering job ever undertaken was 90% lubricated with only *four* different products.

SEE: How one contractor lubricated 21 different types of equipment with only seven products.

SEE: "A Plan for Profits"—Texaco's newest sound and color movie.

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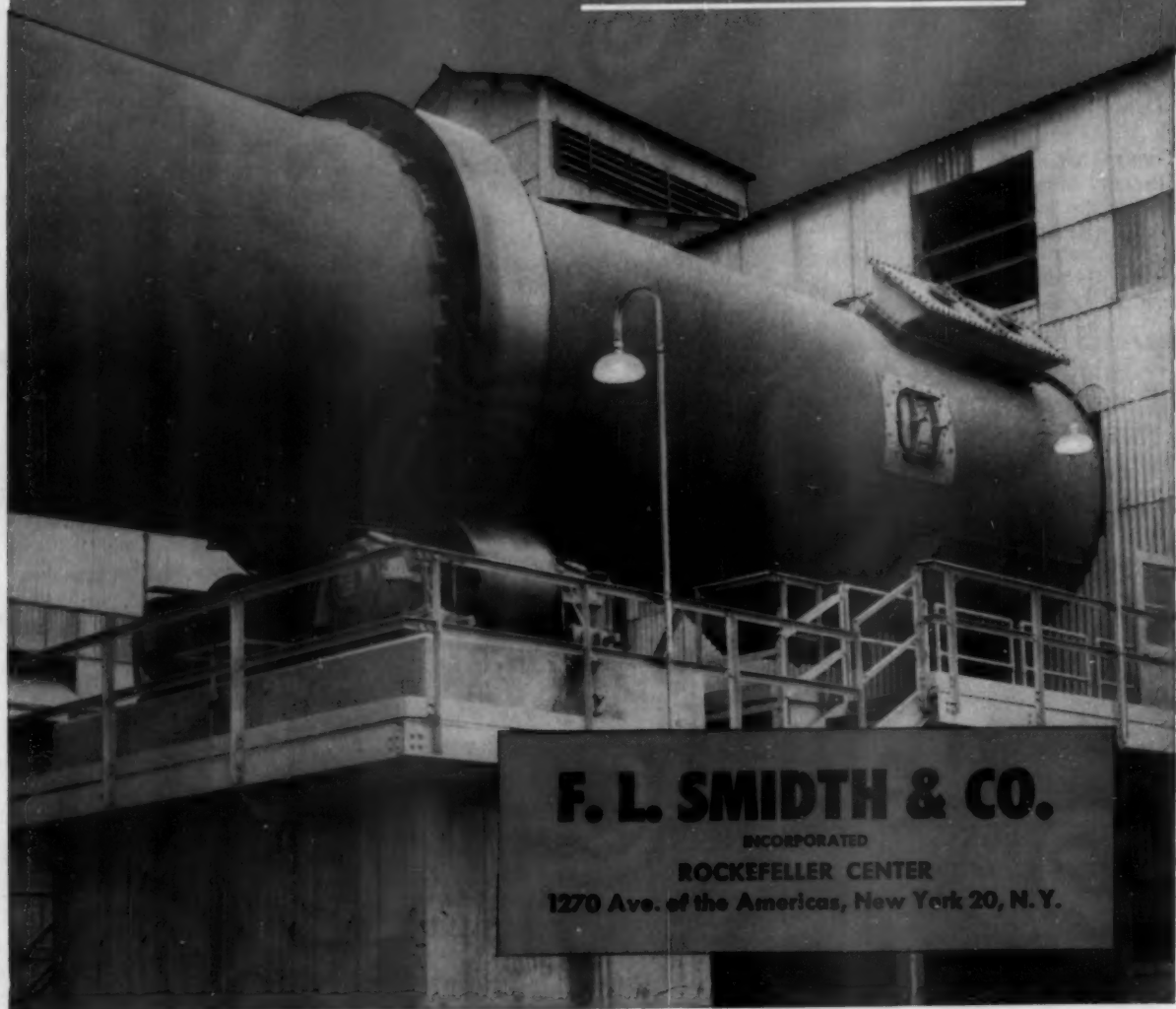


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Integral Slurry Preheater...**

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Save Fuel**



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WHAT'S HAPPENING

in other fields of interest to the rock products industry

A rude jolt can easily await both drivers and highway design engineers when they run tests on the country's most advanced driving simulator. Built by U.C.L.A.'s Institute of Transportation and Traffic Engineering, the simulator contains instruments to record the slightest change in steering wheel movement, acceleration, braking, driver breathing rate and emotional stress. When the system is perfected the driver will face an "unprogrammed" sequence of events. Sitting in a standard station wagon cab on a treadmill of steel rollers, he faces a 10 ft. high semicircular screen in front and must also watch a small screen on the car's rear window. Eventually a 4-projector movie system will change the road scenes as the driver switches lanes or turns off the road. He will also receive a moving image sent back from a scale-model scene. Ultimate purpose of all this intensive study is not only to gain greater insight into driver behavior but to better design the highways of the years to come.

Egyptian pyramids in Canada? Not really. It's a security measure at the new Beloeil, Que., plant of Canadian Industries Ltd. Two buildings, one for the production of crude pentaerythritol tetranitrate (PETN) and one for refining the product, are each covered with 4,000 tons of sand, topped with sod, in case of explosion!

Soil cement is getting its first major use as dam facing, on the upstream slope of Nebraska's Merritt Dam. According to Engineering News-Record (April 6, 1961, p. 24), the Bureau of Reclamation has specified a cement-soil ratio of 14 percent, placed at least 2 ft. thick in 6-in. horizontal layers stair-stepped back along the 4:1 slope.

Nothing beats just plain sand for rooting softwood tree cuttings during tests at the Canada Dept. of Agriculture's nursery station at Indian Head, Saskatchewan. Even peat moss, a traditional favorite of gardeners, couldn't equal sand as a rooting medium during the three-month experiment last summer.

Humanitarian instincts are drawing young engineers into the Peace Corps. Engineering News-Record (June 22, 1961, p. 49) interviewed some of the men who make up the first batch of selectees—specifically a crew in training for a roadbuilding project in Tanganyika. "We are our brother's keeper," a civil engineering major from the University of Michigan told the reporter. "These people . . . have the desire, all they need is the know-how." Another Peace Corps trainee, a structural engineer from the University of Delaware and Vice President of the ASCE Student Chapter there, said he's going "because of the human element. I'd like them to know that we're human beings."

Please turn page

What's Happening

continued . . .

Temperature held within .01 deg. F. and vibration reduced to 1/40 micron are the amazing assets of a new Bausch & Lomb, Inc., building. The precision equipment it houses is used to make ruled optical gratings for light-dispersion work. Diamond cutters rule millions of grooves in each—spaced with an accuracy of better than .01 micron. In order to provide this near-perfect protection, the building has foundations set on bedrock, 11 ft. below grade, with only about 6 ft. projecting above ground. The ruling machines are individually housed in small cells. Being fully automatic, they are expected to run for as long as six weeks without anyone entering.

Raging forest fires throughout the western states are being combatted by a high-density, batter-like slurry. Firebrake, a U. S. Borax product, is dropped from planes (ranging from very small craft to B-17's with over 2,000 gal. capacity) which are kept ready-to-fly at airfields in California, Arizona, New Mexico, Oregon, Washington, Idaho, Montana and Alaska. In California alone, 37 planes are on standby, with 40 others available for emergency use. Firebrake's effectiveness is due to: (a) its ability to exclude air, so that flammable material cannot ignite; (b) the reflective qualities of the white coating, so that fuel is less likely to heat to ignition; (c) various fire retardant properties inherent in the borate salts. Although aerial tankers are useless in high winds, steep canyons and at night, and can't control very hot, rolling fires, last year alone the Forest Service planes dropped almost 6 million gallons on over 1,000 western fires.

Space vehicles of the future may depend for electric power on an unusual device still in the early experimental stages at Battelle Memorial Institute. This plastic-moderated reactor is able to transform the kinetic energy from uranium-235 fission directly into electricity. Unlike other converters, no heat cycle is necessary. Present studies concern possible voltage build-ups, efficiency, and length of cell life.

British builders can make use of an unusual new wall material, which can be cast at moderate heat into many varied shapes and finishes. Called Dohm-cast, it consists of fine mineral granules which are coated with polythene plastic under a special process.

Ultrasonic housekeeping may someday be in store for your cement plant or quarry. The tiniest dust particles—from .001 to 10 microns—that escape other types of collectors can be suppressed by ultrasonic and sonic waves, which exert pressure on any obstacle in their path. These pressures cause the fine particles (aerosols) to collide and coagulate, making them easier to collect. Coagulation is further enhanced when they are wet or sticky, and when the temperature is raised. In operation ultrasonic dust collectors are usually high towers with glazed walls, 25 to 40 ft. high and 2½ to 5 ft. in diameter. They consist of a resonant enclosure equipped with a sound generating unit capable of producing at least one watt per sq. cm., and are used in conjunction with cyclones or other dust collectors. Dusty air should be exposed to the waves a minimum of 10 seconds. Continuing silicosis hazards should encourage development of these units, but before they can be put into wider use they must be made much more efficient. Too, something must be done to combat the nerve strain caused by screaming sirens.

NEW Crawlmaster drill and Gyro-Flo compressor

*...most versatile and powerful
combination available
for 4" to 6½" blast holes*

THE INGERSOLL-RAND CRAWLMASTER is a multi-purpose blast-hole rig with extra weight and power for the toughest drilling jobs. This rugged machine is mounted on dozer-type crawlers with enclosed gear drive from two 11½-hp air motors, and interchangeable drill units permit percussion, rotary or Downhole drilling of 4" to 6½" holes at any angle from vertical to horizontal. Features include hydraulic feed and retraction, remote controlled reverse rotation, 30" hydraulic leveling jacks and simple ejector-type dust collector.

Ample air power for all Drillmaster functions is provided by a 900-cfm Gyro-Flo rotary compressor—the last word in portable compressor economy and dependability. Simplicity of operation, freedom from maintenance, small size and light weight, air temperatures under 200°F, low oil consumption and closer regulation at all loads make Gyro-Flo the ideal running mate for the new Crawlmaster drill.

Ask your I-R distributor or engineer for complete information on the cost-saving Crawlmaster Gyro-Flo combination.



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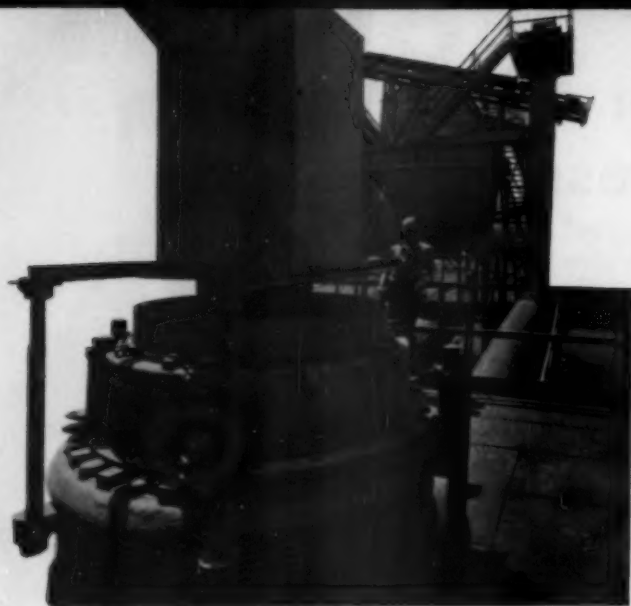
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FOR REDUCTION CRUSHING

Symons® Cone Crushers are built in both Standard and Short Head types, in sizes from 22" to 10' in diameter. Capacities to 1500 or more tons per hour.

Illustrated is one of many Symons Cones used for the profitable, big tonnage crushing of slag.

Assure profitable production of Aggregates, Crushed



FOR PORTABLE PLANT SERVICE

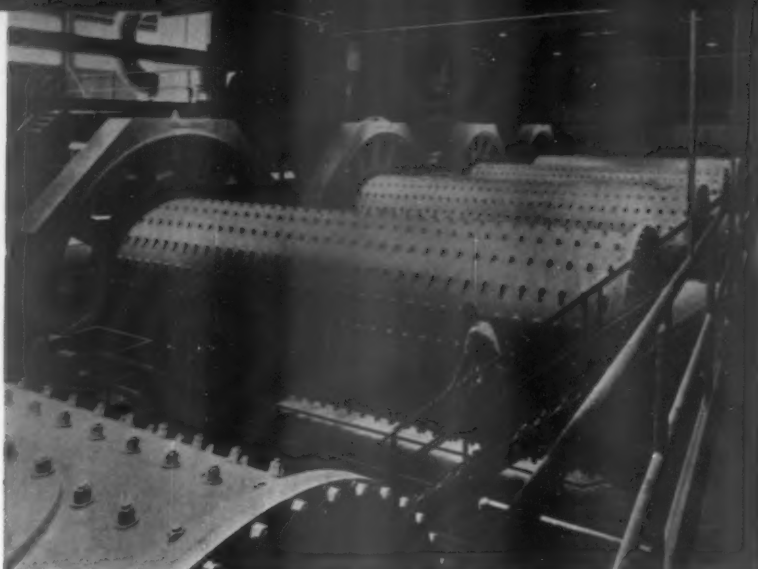
Increasing numbers of portable plants are built using Symons Cone Crushers for big capacity of fine product . . . such as the portable crushing plant at left, which utilizes a 4' Symons Cone Crusher and a Symons Horizontal Vibrating Screen.

FOR SCREENING

From scalping to fine screening, there is a Symons Screen built to do the job at low cost. In the illustration at right, two Symons V-Screens® are used in conjunction with a 54" Gyradisc® Crusher* to handle a daily production of up to 500 tpd of manufactured sand and a filter medium . . . both "premium" products made from previously unsalable torpedo gravel.

*Gyradisc Crushers are used for volume production of fine specification material often supplanting the need for comminution by grinding mills.





FOR WET AND DRY GRINDING

Nordberg Grinding Mills include Rod, Ball, Pebble, Tube and Compartment types, in sizes up to 13' in diameter and up to 50' in length.

Shown at left are five 12' x 36' Nordberg Mills installed in a 5 million bbl. per year wet process cement plant in Michigan. These are the largest grinding mills ever built.

Sand and Cement with NORDBERG MACHINERY

FOR PYRO-PROCESSING

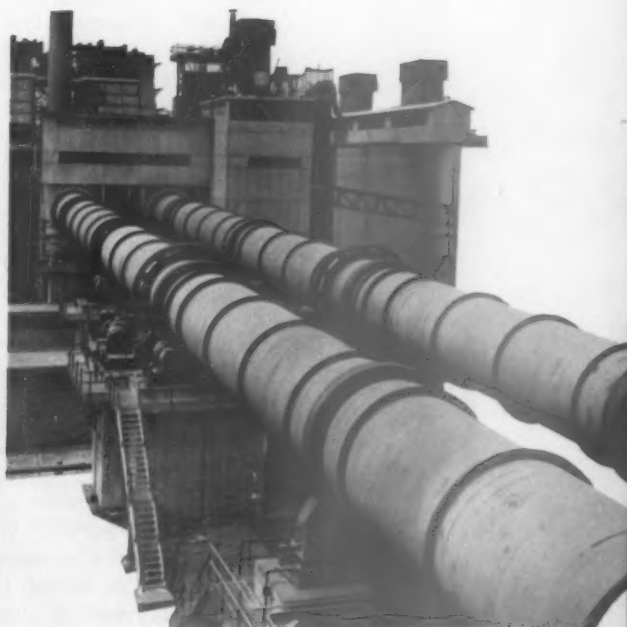
Nordberg Rotary Kilns and Dryers for pyro-processing and calcining cement, lime and other materials, are manufactured in various diameters and lengths to meet specific requirements.

The two Nordberg Kilns at right are 11' x 360' units, serving a midwestern cement manufacturer.

FOR POWER GENERATION

Nordberg two and four cycle engines are built in sizes from small 10 horsepower units to over 12,000 horsepower in a single engine . . . for Diesel, Duafuel® and Spark-Ignition Gas operation.

Below is a 4425 bhp, 3150 kw Nordberg Engine installed in a large Texas cement plant.



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EDITORIAL

by George C. Lindsay

You can save \$10,000 a year

THE PRESIDENT OF AN AGGREGATES PRODUCING COMPANY introduced a preventive maintenance program at his property just a year or two ago. He gave full responsibility for the program to his plant superintendent, and instructed him to make the program tick.

"It's costing us too much in labor and materials to keep our plant going," he told his superintendent. "Worse than that," he revealed, "plant down time is getting so high it's wrecking our profits."

The president, with his superintendent and engineer, outlined a program that included all the essentials of an up-to-date plan. It provided for a good maintenance accounting system that included adequate cost reports for each piece of major equipment. It set up a plan of regular testing and inspection, with arrangement for good communications between production and maintenance departments.

Training of personnel began. Separate types of training courses were instituted for supervisors and for maintenance personnel according to their job classification.

Last month, the superintendent reported to his company president that the plan had worked well. Maintenance costs had been cut 26 percent by the program. The producer quickly figured a saving of \$25,000 a year, and immediately instructed the superintendent to give him a report outlining improvements that could be made in the maintenance program.

This hypothetical story represents the average plant that answered a ROCK PRODUCTS questionnaire on maintenance. Results of that survey are reported in this issue, beginning on page 86.

It's highly possible that those who cooperated with us on this survey included many above-average plants. The results were that good. But the industry can do better. Using the survey as a basis, it is estimated that the average aggregates plant could save \$10,000 a year by lowering its current maintenance costs by 10 percent.

If you think that's worth going after, you'd better get your maintenance program underway pronto.

RAYMOND

LOW COST PULVERIZING

with the **VERSATILE**



BOWL MILL

FOR DIRECT FIRING ROTARY KILNS

After more than 25 years of top-level performance in the cement industry, these modern Bowl Mills still lead the field in pulverizing economy and kiln burning efficiency. Because of time-proven advantages, more and more operators of cement, lime and dolomite kilns are equipping their new plants with Bowl Mills . . . or converting their old plants to Bowl Mill installations.

The principle of incorporating a revolving bowl and stationary grinding rolls, with no metal-to-metal contact, provides wide range capacity at continuous 24 hour, noiseless, vibrationless operation. Availability is almost 100 per cent.

Write for Bowl Mill Catalog Number 92 R.

RAYMOND MECHANICAL AIR SEPARATOR

This unit, available in nine commercial sizes, is equipped with a patented revolving Whizzer, single or double type, and offers three general types of application.

- A. In closed circuit with a grinding unit for increasing fineness and mill capacity.
- B. In open circuit operation for removing a coarse fraction to deliver a uniformly fine product.
- C. In open circuit for dedusting operations to remove objectionable fines in making granular products.

An internal air distribution system for handling special materials, which require cooling or drying may be provided. Additional liners are furnished for classifying abrasive materials.

Write for Raymond Mechanical Air Separator Catalog Number 90 R.



Double Whizzer Separator
showing air openings.

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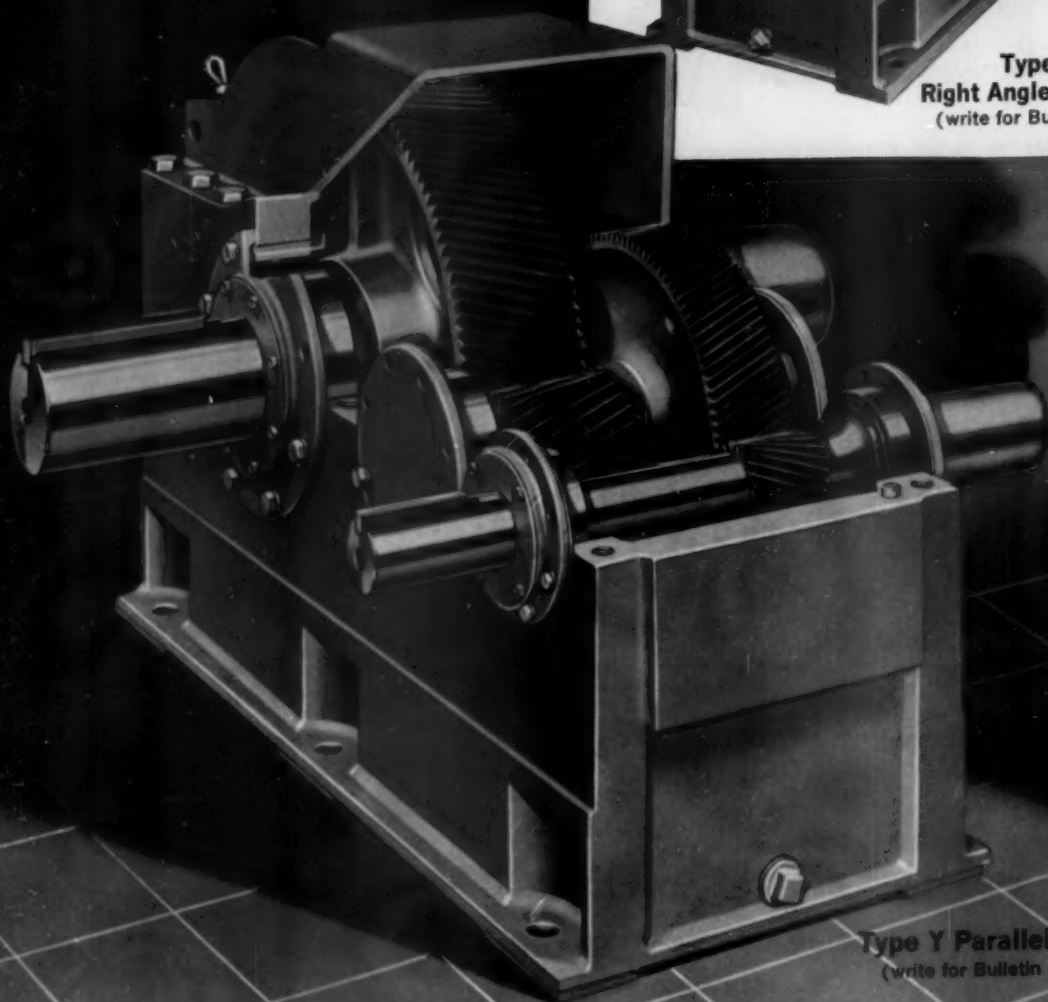
ROCK PRODUCTS, September, 1961

FALK INTRODUCES 2 NEW SERIES OF VERSATILE SPEED REDUCERS

Designed to serve industry's current and future requirements



Type YB
Right Angle Horizontal
(write for Bulletin 2100)



Type Y Parallel Shaft
(write for Bulletin 1100)

Parallel Shaft and Right Angle Horizontal Reducers cataloged thru 1,570,000 lb-in. torque at low speed shaft ...larger units upon request. Ratios 1.84 thru 292 to 1 for parallel shaft; 5.06 thru 1207 to 1 for right angle horizontal

These new units are probably the most thoroughly engineered speed reducers on the market today. Final designs based upon years of development study and a background of 50 years experience make these units as dependable as the name "FALK". A few of their many features are...

PINPOINT APPLICATION COVERAGE Wide choice of sizes and ratios permits the most economical selection of a correctly rated unit for each application. In each series of parallel shaft and right angle reducers, cataloged sizes range up to 1,570,000 lb-in. torque at the (11 inch dia.) low speed shaft. (Other standard designs to 25,000,000 lb-in. torque; custom designs for higher capacities.)

UNMATCHED VERSATILITY The "Basic Y" speed reducer design permits economical modification to meet a multitude of specific requirements. Smooth, flat surfaces simplify mounting of motor brackets, backstops, brakes, and any number of other accessories.

RUGGED HOUSINGS Sturdy housings not only provide maximum rigidity to maintain proper alignment of gearing, but also have the strength to support heavy overhung loads and withstand accidental blows.

DEPENDABLE FALK GEARING Gears are selected with the proper proportions and hardness to provide the optimum combination of maximum durability and strength for high shock as well as uniform loads.

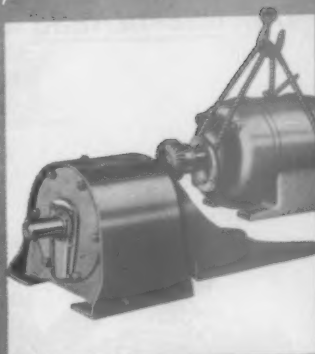
BEARINGS TO SUIT THE OVERHUNG LOAD Standard reducers can meet custom-built requirements with optional stock bearings and shafts (at only a nominal extra charge.) Maximum overhung load capacities are so great that for some conditions, still within the capacity of the reducer, extra strong supporting foundations and bolts must be provided.

DOUBLE GEAR LIFE Standard double ended shafts can be reversed end for end to bring into contact the unused surfaces of the gear teeth for twice the normal gear life.

SEALS FOR ALL CONDITIONS Standard equipment oil seals assure oil-tight and dirt-free gear units for normal applications. Standard abrasive and moisture-resistant seals available upon order.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS
Representatives and Distributors in most principal cities

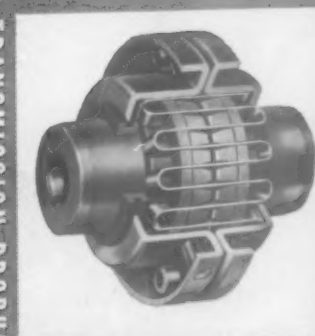
SOME OTHER MEMBERS OF AMERICA'S FIRST FAMILY OF POWER TRANSMISSION PRODUCTS



ALL-MOTOR MOTOREDUCERS



SHAFT MOUNTED DRIVES



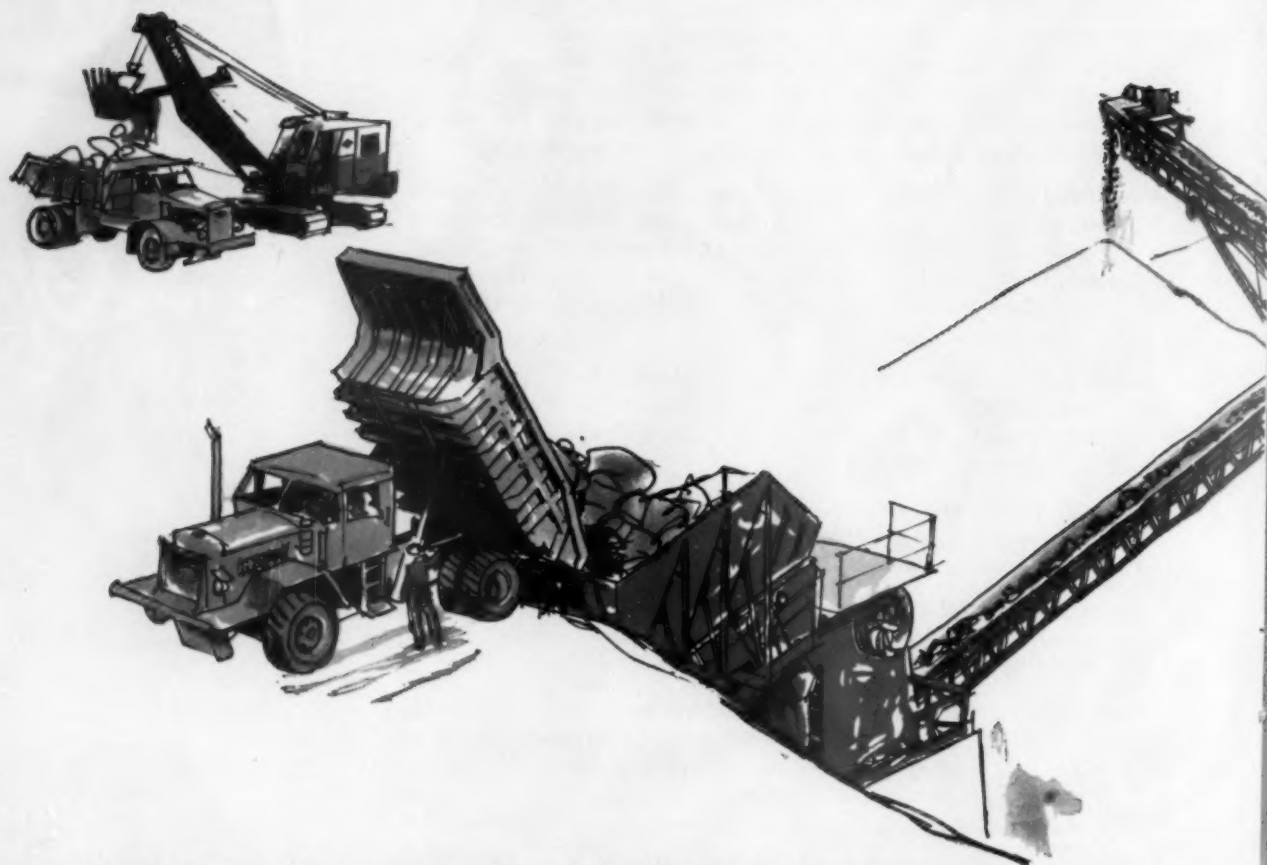
STEEFLEX COUPLINGS

FALK

A GOOD NAME IN INDUSTRY

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THE USEFULNESS OF A LIMA AUSTIN-WESTERN



MORE ROCK FOR LESS MONEY...

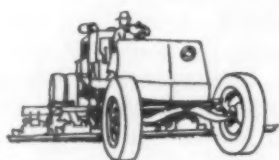
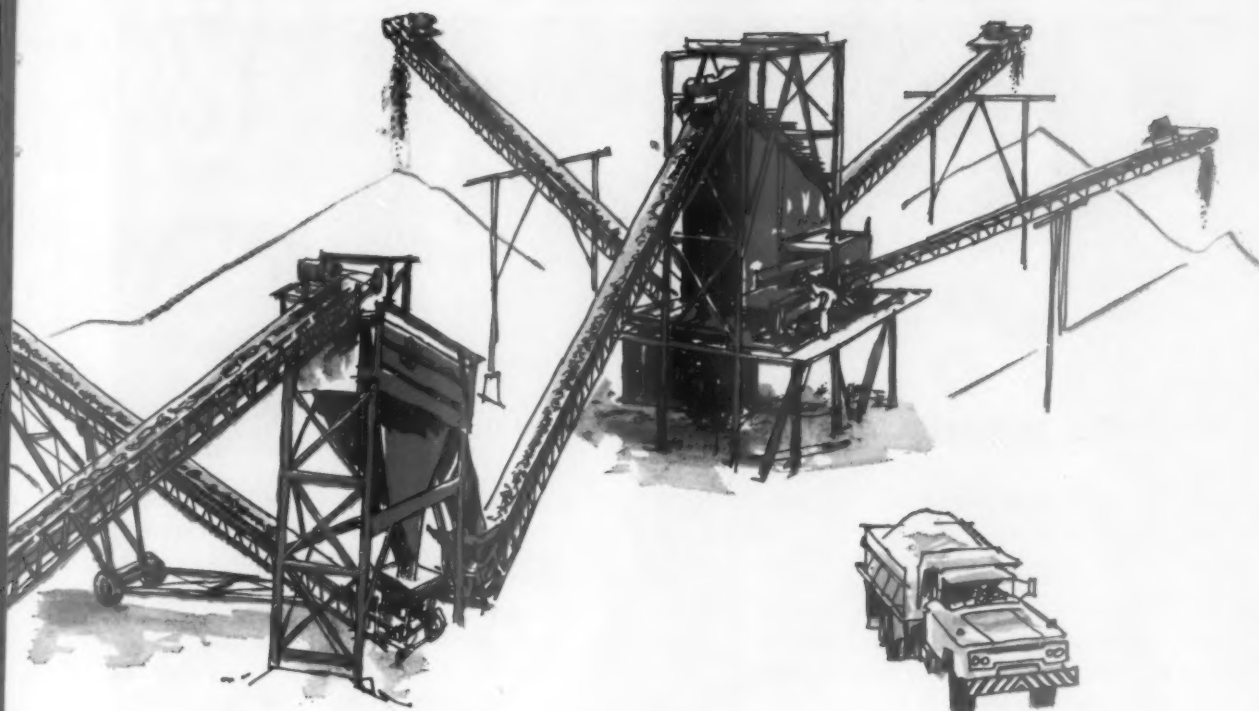
More for less, of anything, is a rarity today. But you can get it with a Lima Austin-Western stationary crushing installation like this, because it is a high-speed, big-output operation from start to finish. It can be custom engineered for a specific operation—*such as yours!*

High performance is possible because only the finest materials are used—such as antifriction roller bearings and many special-strength alloy steels scientifically checked for structural perfection. Years of manufacturing experience have produced highly refined designs which eliminate many troublesome shafts, gears, sprockets, clutches, chains and belts. Deep crusher jaws with long, smooth stroke assure dependably high production—more yards per hour, lower cost per yard.

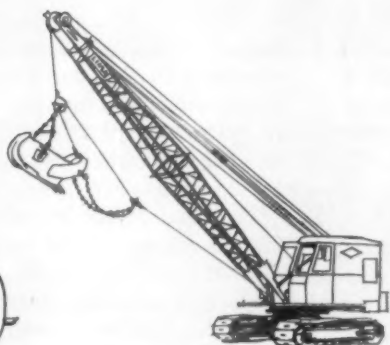
The Lima Austin-Western line includes many sizes of jaw and roll crushers, matching screens, elevators, feeders, conveyors and bins. Portable Lima Austin-Western crushing plants are available in various models to fit your exact requirements.

Ask us now for facts and figures on the profit-producing performance of our crushing, screening and washing equipment.

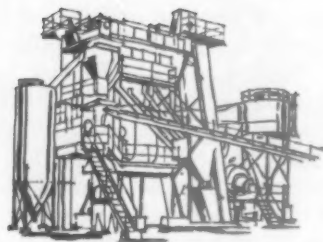
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—Six vibrating shoes compact fast and deep for profitable single-course construction; available in 12-shoe Super model.



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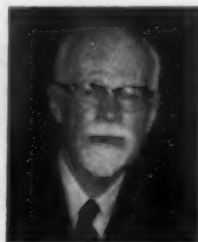
LIMA MADSEN ASPHALT PLANTS
—available in models with batching capacities from 1000 to 10,000 lb.

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ROCKY'S NOTES

by Nathan C. Rockwood



Something about the chemistry of silicon

IT SEEMS TO HAVE BEEN CUSTOMARY to consider portland cement primarily as a product of lime. Historically that is logical, for the invention or, more properly, the development of portland cement was the result of attempts to convert ordinary quicklime into a hydraulic cement. However, it has always seemed to us, the real key element that makes a cement is not the calcium (in the form of an oxide) but the silicon (whether or not in the form of an oxide). It is interesting and significant that the first really scientific studies of hydraulic cement were made by a chemist who had specialized in studying the silicates—the Frenchman, Henri Le Chatelier. Compared to calcium, silicon is by far the more reactive. It is the element that holds the Earth's crust together.

We now have before us a small book that does not even mention portland cement, but we believe it contains information essential to any intelligent approach to a genuine understanding of cement. It is a new book, translated from the Russian text, entitled "Silicon and Its Binary Systems,"* by A. S. Berezhnoi. Of course, the binary system of silicon we are most interested in is its compound with oxygen SiO_2 , but it is doubtful if any real research chemist in portland cement should be satisfied merely with what he can learn about silicon from its one compound, silica, or SiO_2 . And there is an astonishing variety in that one compound insofar as chemical and physical properties are concerned. This book devotes 40 pp. to this Si-O system, and these pages alone justify any reader interested in SiO_2 either as a raw material or an ingredient of cement in possessing this treatise.

The author treats his subject in a logical manner, taking up in their order all the known compounds of silicon with the elements in each of the atomic groups in rotation. His summary contains a result of a very thorough and extensive search

of the literature on his subject, his bibliography containing a list of 716 titles by Russian, French, German, English and American authors. While scientific interest in the element silicon has been largely confined to geologists, petrologists and metallurgists, increasing use of this new knowledge thus gained is being made in the manufacture of high-temperature refractories, alloys and electronic equipment or instruments. We have yet to hear of a portland cement manufacturer's chemist who has made use of this new and expanding knowledge of silicon.

Our author states that while the element silicon is never found in a free state in nature, about 57 percent of the earth's crust is made up chiefly of various silicates, and that approximately 13 percent is free silica (silt and sand). The amount of silicon in this earth's crust is 26.2 percent of all the elements, making this element second only to oxygen in relative abundance. There are three stable isotopes of silicon and, as known at present, three radioactive isotopes. Table 2 in the book gives a list of the structural, physical and chemical properties of 164 binary compounds of silicon with the other elements. The subsequent descriptions give detailed information on their preparation and uses in a very general way, that is as alloys, refractories, glass, etc.

The general assumption, in discussions of the chemistry of portland cement, seems to be that silica in the raw material reacts with lime, or CaO , as such, and apparently never changes from its oxide form. The cement clinker is assumed to be a mixture, or compound, of the original oxides. If cement chemists will study this book, it may raise some doubts in their minds as to the truth of the assumption that the chemical reactions are entirely between the oxides. This is certainly not the case with metallurgical slags. If we read understandingly, there must be conditions in the manufacturing process of portland cement, where or

Please turn to page 142

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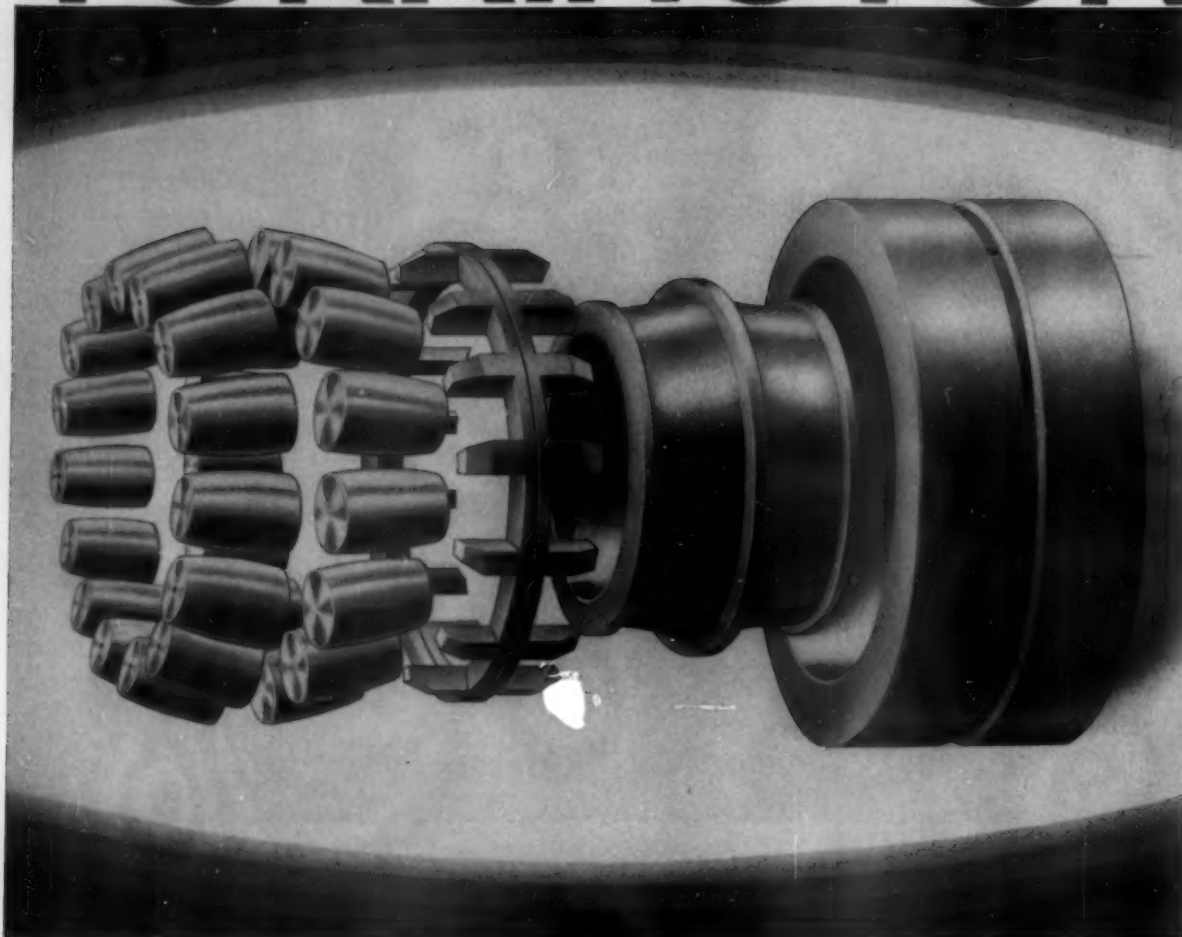
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ROCK PRODUCTS, September, 1961

TORRINGTON



FOR THE INSIDE STORY...

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Every roller is matched electronically within .0001" for even-load distribution and maximum capacity.

Each independent land-riding cage spaces rollers precisely...prevents roller drag even under the heaviest loads and possible misalignment.

The integral guide flange is ground to a common spherical radius with the roller ends for positive roller guidance, greater stability.

For minimum friction and wear, both inner and outer races are precision ground to conform exactly to roller contours.

Put together...a Torrington Spherical Roller Bearing for superior performance, reliability and long service life. Buy the best...specify Torrington.

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- ☐ long, dependable service life

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TORRINGTON BEARINGS

South Bend 21, Indiana • Torrington, Connecticut

WASHINGTON LETTER

by Edgar Poe

Interstate System on Schedule

The tremendous Interstate Highway program which Congress authorized in 1956 now appears likely to be completed on schedule, unless a great national emergency grips this country. Work for the construction industry is likely to be stepped up in the months ahead. Under terms of the Act which raised taxes on trucks and tires and cancelled a scheduled cut in gasoline taxes, an additional \$11,500,000,000 was authorized in roadbuilding grants to the various states.

The law is designed to keep the 41,000-mile Interstate system on a pay-as-you-go basis until the last stop-light-free mile of the expressways is completed in 1972. The states will continue to put up \$1 for each \$9 by the federal government, but the states must assume the responsibility of the upkeep, which will come high.

Five-year Tax cut plan Introduced

A measure that would reduce both the individual and corporate tax rates over a 5-year period to a maximum of 47 percent has been introduced in Congress. The lowest personal tax cut would amount to 15 percent. The measure is sponsored by Representatives A. S. Herlong, Jr., (D-Fla.); Howard W. Baker, (R-Tenn.), and Bruce Alger, (R-Texas). The proposal would ease tax depreciation of business and cut estate and gift taxes to help small firms pass from father to son.

FHA PVC soil Test meter Report out

The Federal Housing Administration insures mortgages on residences. If the mortgagor defaults on his payments, FHA assumes ownership of the house and pays the bank that portion of the unpaid mortgage. To keep losses at a minimum, the FHA only insures mortgages on residences that meet certain construction standards and specifications.

One type of foundation soil causing damage to many dwellings are the so-called swelling or expansive soils. In an effort to aid personnel unfa-

miliar with soil engineering and soil classification, the FHA needed a field testing device capable of identifying expansive soils.

Engineers dealing with various types of soils will be interested in the recently published technical study report on the "FHA PVC Meter." It includes all research background, a summary of environment and moisture conditions related to volume change and behavior, and a complete explanation of the laboratory testing program conducted in the development and calibration of the soil testing device. FHA has expressed the belief that considerable savings may accrue to home owners and builders by pretesting soils before construction begins, and the agency expressed confidence the PVC Meter will be of assistance.

Small firms Growth Bills

Measures designed to encourage growth and prosperity of small firms are being planned in Congress. Among the proposals: grant small firms up to \$30,000 a year federal tax deductions for funds reinvested in an effort to spur inventory buying; permit self-employed persons to delay funds set aside for retirement, and to permit a fast depreciation of used equipment.

Town asks To annex A quarry

In a little Virginia town not far from the Nation's Capitol, residents are complaining about the rumbling of a rock quarry and trying to annex the quarry land area. Residents of Occoquan (pop. 600) are unanimously in favor of annexation, according to R. S. Hall, long-time town councilman. Said he: "It isn't that we want to run them out of business—only that we want control over them."

The square mile that the town council wants to annex in adjacent Fairfax County also includes an asphalt plant and the reservoir for the Alexandria Water Co. Occoquan residents charge that operation of the quarry breaks windows, rattles dishes, and scatters rock and dust. *Please turn page*

Washington Letter

continued . . .

Construction; New jobs Legislation

A double-barreled program, designed to provide for expanding construction and to create many jobs in all sections of the country, is pending before Congress. A primary feature is a multi-million dollar community facilities bill to help finance local water, sewage, housing and other projects. The so-called liberal factions in Congress are pressing for the plan. However, some alternatives are pending. Included are proposals for federal grants for retaining workers and creation of a youth conservation corps.

Sen. Joseph Clark, liberal Democrat of Pennsylvania, is pushing the public works bill. His measure would authorize \$1 billion for public works, providing \$500 million in federal grants to local communities with discretionary authority to spend another \$500 million if high unemployment in surplus labor areas persists after the first \$500 million has been spent.

Housing act Provides for Billions

The Kennedy Administration's catch-all housing law, one of the most liberal ever enacted by Congress, will mean an increase in business for the rock products industries. It is a multi-billion dollar measure. It not only authorizes 100,000 new units under extension of the public housing act, it provides for \$2 billion for urban renewal, plus many millions for school dormitories and apartment buildings. Congress extended the provision involving below interest rate loans for rental housing for the lower division of middle income families. It also liberalized mortgage insurance on single family homes from \$22,500 to \$25,000.

The law earmarks \$25,000,000 for grants for mass transportation demonstration projects, as highways and expressways from the suburbs become more and more choked.

Piggybacking OK is great RR victory

The railroads, depressed economically by hardhitting competition from the trucking industry, have rolled up a great victory. The Interstate Commerce Commission holds that railway piggybacking is not only legal, but is good business for the railways.

Piggyback service, which has tripled in the past several years, consists of truck trailers laden with freight and moved on railroad flat cars. The major victory for the railroads is a setback for the trucking industry. President Jarvis Langdon,

Jr., of the Baltimore & Ohio Railroad said the ICC decision "recognizes the right of railroads to make competitive rates."

The decision involved "Plan III" and "Plan IV." "Plan III" is the piggyback service on rail flat cars or trailers furnished by the shippers; the other plan involves flat cars as well as trailers being furnished for door-to-door delivery.

Aid to small Business up Before Congress

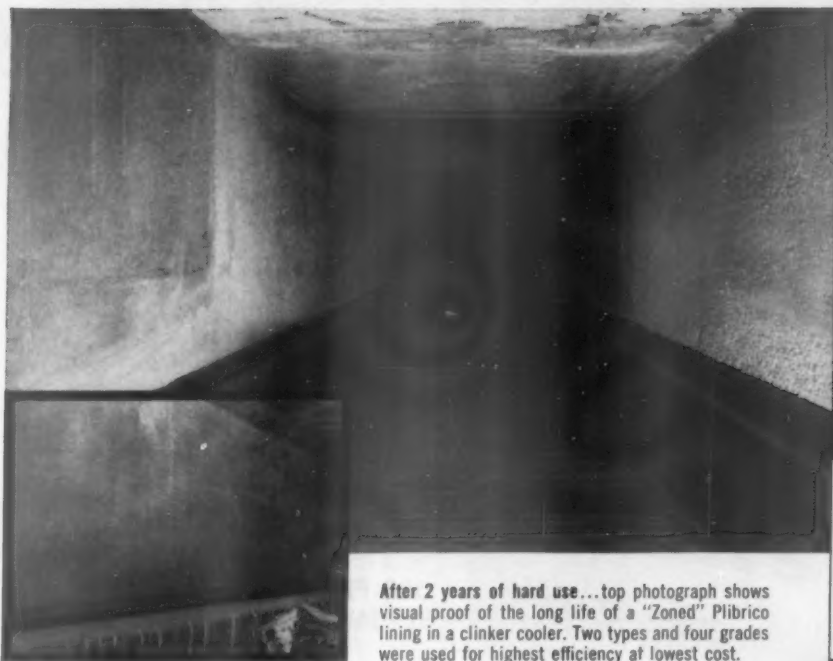
There is marked criticism on Capitol Hill of the federal government's asserted neglect of small business. As a result, there is pending a series of bills that would aid small business, including tax adjustments. Criticism is based mainly on these Congressional charges: the government has neglected small business in awarding research contracts; there has been a "shocking decline" in the proportion of government procurement going into small business; unfair and monopolistic competitive methods applied by large corporations have "evaded censure" because of loopholes in anti-trust laws or "ineffective enforcement" by government agencies.

Water Resources Development

President Kennedy has appealed to Congress for priority consideration of a water resources program which includes irrigation, navigation, water pollution control, water desalinization, watershed development and flood control. The whole, broad, long-range program has strong support in Congress from members in all parts of the nation.

Space age Industries Are zooming

Andrew Haley, past president of the International Astronautical Federation predicts that within 20 years the space and astronautics industry will be even bigger than the automotive industry in this country. Some economists are now forecasting that the space age may be one of the big jobmakers of the future. Some scientists have predicted to Congress that whoever controls space will control the world. Meantime, the National Aeronautics and Space Administration is stepping up its efforts on behalf of "Saturn," America's lone entry in the race for the moon. Some of the top scientists in the Nation's Capitol feel that the Soviet Union is not more than six months away, if that far, in their efforts to land a team on the moon and bring it back.



After 2 years of hard use...top photograph shows visual proof of the long life of a "Zoned" Plibrico lining in a clinker cooler. Two types and four grades were used for highest efficiency at lowest cost.

Excellent record...after 4½ years constant service only minor repairs were needed in the burner zone of this dryer furnace designed, constructed, and lined by Plibrico. Called "satisfactory in every respect" by Illinois Brick Co. vice president.



Maintenance only 57¢ a month per furnace at Snively Groves, Inc. Five Plibrico lined citrus feed dryer furnaces operated four seasons (seven months per season), and the total repairs needed cost but \$79.23 including material and labor.

Here's why "Zoned" Plibrico refractory linings last longer... cut "down time" and maintenance costs

Increased efficiency...lower cost..."Zoned" one-piece linings coordinate various grades of refractory to match temperature and operating requirements in each furnace zone.

Vibration problems eliminated by permanent Plibrico anchorage.

Repair work confined to damaged areas only when Plibrico construction methods and refractory materials are used.

Less heat loss...cooler, safer working conditions.

Easily follows any contour...no costly special shapes needed with Plibrico monolithic lining.

Inside furnace area enlarged...thinner Plibrico refractory walls increase productive capacity.

One-source guarantee...you'll save time and inconvenience when you deal with one supplier who bears the full job responsibility. Users the world over rely on Plibrico's nine plants...and here's why... (1) Plibrico refractory materials are tested and quality controlled from mine to installation; (2) experienced Plibrico engineers can design virtually any heat enclosure; (3) Plibrico installation crews are fully trained and supervised.

Contact your local Plibrico Field Engineer...investigate the cost-saving advantages of Plibrico's complete 3-in-1 service on your next refractory installation.



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80% fewer pieces in this Plibrico clinker cooler arch nose. Simple design is the key to the long life of every Plibrico lining. Ordinary linings require 85 pieces while Plibrico uses only 17. When repair is finally needed, it's much easier.



1292

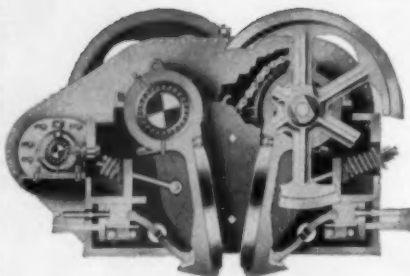
Write for illustrated catalog #73...packed full of ideas for reducing maintenance costs and ways to make linings last longer.



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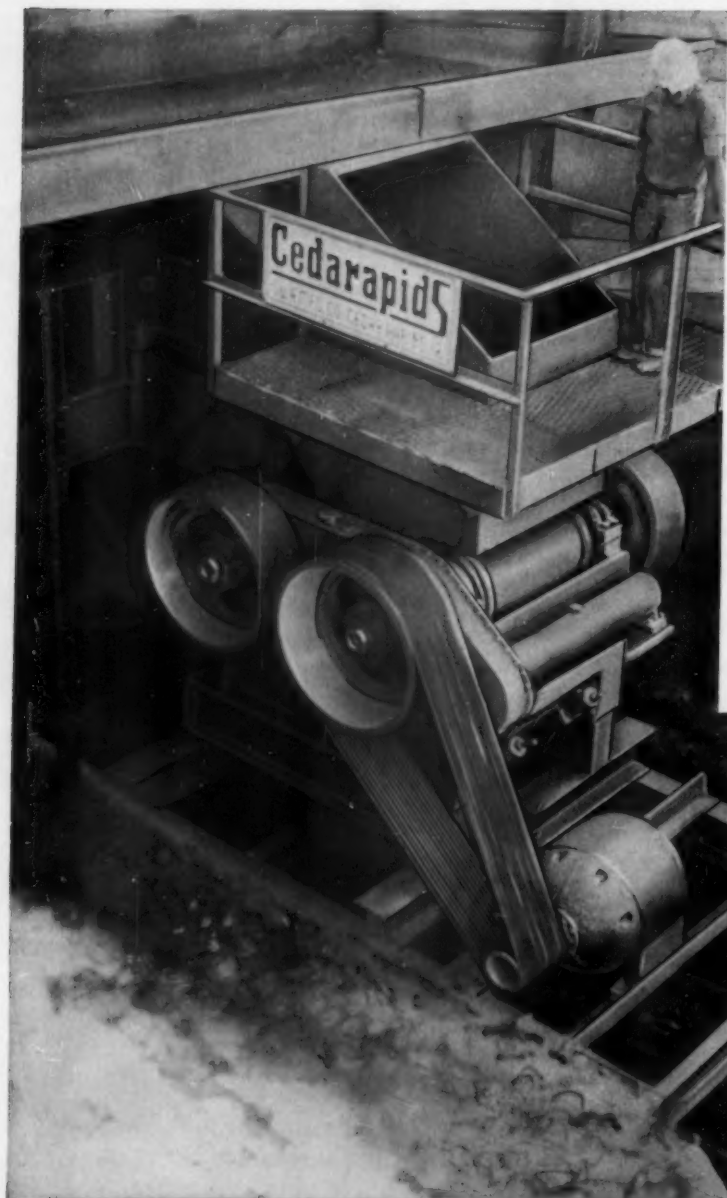
Make more money on your toughest **CEDARAPIDS JAW**

When you crush more rock, you make more money . . . especially if you're working in tough, abrasive granites, cherts, basalts, etc. That's why you need the benefits of high-capacity Cedarapids Jaw Crushers in your plant. For instance, a Cedarapids Twin Jaw Crusher turns out 40% to 100% more material than a single jaw of comparable size, yet jaws last 5 to 8 times longer. Translate *that* into terms of dollar profits!



JOB-PROVED BENEFITS THAT SET JAW CRUSHER STANDARDS FOR THE INDUSTRY

- Overhead eccentric throw, the angle of the toggles, and length of jaws are properly correlated for maximum crushing capacity and rapid discharge.
- Eccentric shaft extra heavy to absorb strain and minimize shaft flexure.
- Adjustable-tension timing chain drive on Twin Jaw Crushers prevents trouble due to possible shaft flexure. No fine-cut timing gear that requires critical alignment.
- Heavier than average self-aligning pitman bearings placed close as possible to side bearings to absorb side thrust and prevent strain under heavy load.
- Reinforced, electric-welded crusher bases are completely stress-relieved for long life.
- Extra-heavy flywheels insure smooth operation under surge feeding with minimum power.



crushing jobs with **CRUSHERS**

TWIN JAW or SINGLE JAW—

there's a size for every capacity requirement

Cedarapids Twin Jaw Crushers are recommended for high capacity output in hard or abrasive rock and in gravel pits containing high percentages of oversize. In certain conditions, they are profitably used where their high capacity permits them to replace a combination of single jaw and roll crushers. Available in 12" x 16", 12" x 36" and 18" x 36" sizes.

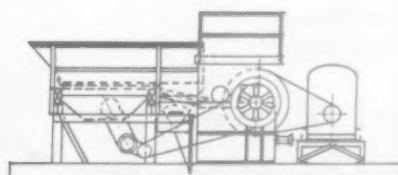
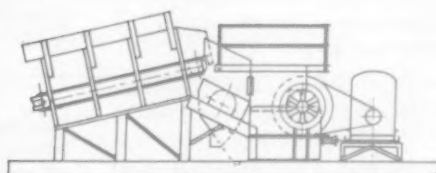
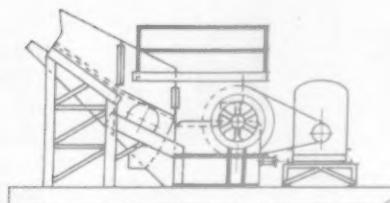
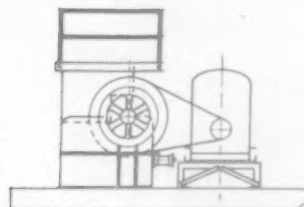
For conventional crushing jobs, the broad line of Cedarapids Single Jaw Crushers includes plain and roller bearing models in seventeen sizes, from 9" x 16" to 42" x 48".

Cedarapids Stationary Plant Engineers ...

can engineer your plant to make more money for you. They are experienced in analyzing specific job conditions (including raw material, feed sizes, possible contamination, percentage of fines or hard and soft stone) with an eye to meeting specifications with the tonnages you want. They are experts in recommending the correct units for the specific job and in designing plants with minimum structural costs. The result is a clean plant, efficiently laid out with only the exact units you need, which returns more profit per dollar of investment. Get Cedarapids Engineering for your next stationary plant or to modernize your present operation. There's no obligation ... just call your Cedarapids Dealer for full details.

SKID-MOUNTED FOR FAST, EASY INSTALLATION

Check the time and money saving benefits of Cedarapids skid-mounted crushers. These completely engineered units are "packaged" at the factory, ready to be set up on concrete piers with no additional engineering. Four of the many combinations available are shown below.



Cedarapids

Built by
IOWA

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

Cedarapids 42" x 48" Single Jaw Crusher, working in South Carolina granite, is producing 300 tons per hour of 6" material, crushing 100%.



S1161 H

ROCK PRODUCTS, September, 1961

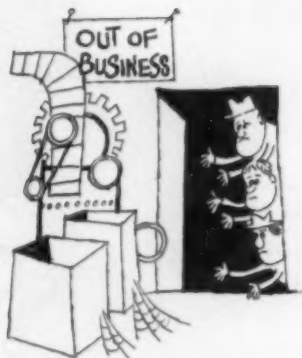
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LABOR RELATIONS

A roundup of actual day-to-day in-plant problems and how they were handled by management men

How would you decide?



If a department closes down, are employees on layoff entitled to severance pay?

What Happened: The company had a severance-pay policy which said: "When a department is permanently discontinued, employees whose jobs are terminated shall receive severance pay." The severance pay schedule ran as follows:

Continuous Service	Severance Allowance
3 yr. but less than 5 yr.	4 weeks
5 yr. but less than 7 yr.	6 weeks
7 yr. but less than 10 yr.	7 weeks
10 yr. or more	8 weeks

At the time the company decided to close one department, 23 employees were on layoff. They demanded severance pay. This was refused. The company said, in effect:

1. Severance pay applies only to employees who are actually displaced from their jobs as a result of the closing of the department.

2. These employees were laid off long before the decision to close the department was made. They were without jobs because of poor business, not as a result

of the discontinuance of a department. Therefore, our liberal severance policy does not apply to them.

Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Feinberg ruled: "The 23 employees are entitled to severance pay. A laid-off employee does not lose his status as an employee. Only when the company closed down the department were these employees terminated. They are entitled to be paid."

Can management discipline an employee for misbehavior off company premises?



What Happened: At a safety meeting, Supervisor Bauer laced into some of the employees for unsafe work habits. One man took issue with the boss's comments, and heated words were exchanged. That evening when Bauer came home he was met by the worker who continued the argument.

"You've no right here," the foreman said. "Now go on your

way. If you want to talk to me, see me at the office."

The employee continued to berate his boss and then struck him with a "blunt instrument."

When he was summarily fired the next day, he charged that the company had overstepped its authority and argued:

1. I lost my head. I didn't mean to do it.

2. Let the police and the court deal with my action. What I did was on my own time and away from company property.

The company countered:

1. We have a right to control employees for off-property conduct if the argument grew out of an in-company situation.

2. We'll not stand by and let workers abuse our supervisors on or off the company premises.

Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Garrett ruled: "I cannot accept the view that management is powerless to discipline an employee for conduct (directly related to events in the plant) which entails assault upon a member of supervision. While public authority is available to deal with those who commit assault and battery, this does not deprive management of essential authority to maintain discipline and protect members of supervision from unprovoked reprisals away from the plant. The employee was properly discharged."

Please turn to page 36

ONE TON FOR 6 CENTS...Total Digging and Hauling Cost with a Sauerman



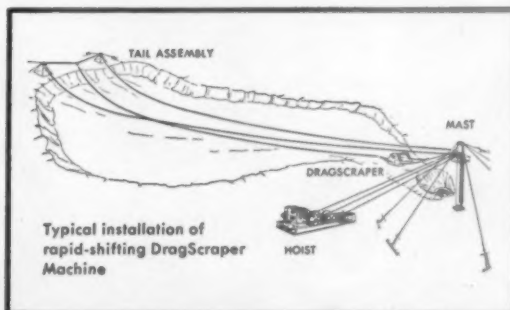
Dig and haul from your high bank, deep pit or underwater deposit direct to plant hopper or stockpile for 6 cents per ton. This cost is based on current job figures for Sauerman DragScrapers operating over average depth and haul distances.

The reason: one man and one machine handle the entire job. You save money three ways over multiple machine methods. Your power costs are much lower. A single operator replaces two or more on your payroll. Your maintenance costs are much lower because only the DragScraper Bucket and cable contact the material handled.

If you are hauling over distances up to 800 ft. or digging under water at depths to 100 ft.—the Sauerman DragScraper Machine is the most economical means you can use.

You can get DragScraper Machines in sizes from $\frac{1}{8}$ to 15 yds. to match your tonnage requirements. Write or call about the physical dimensions of your deposit. We'll recommend the proper machine. For general information and detailed data on specific installations request Catalogs A and SG-1.

Plant Operators Are Saving On Power, Labor And Maintenance With Sauerman DragScraper Machines



DragScraper Bucket deposits load of sand onto grizzly hopper.

SAUERMAN BROS., INC.

630 So. 28th Ave., Bellwood, Illinois
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

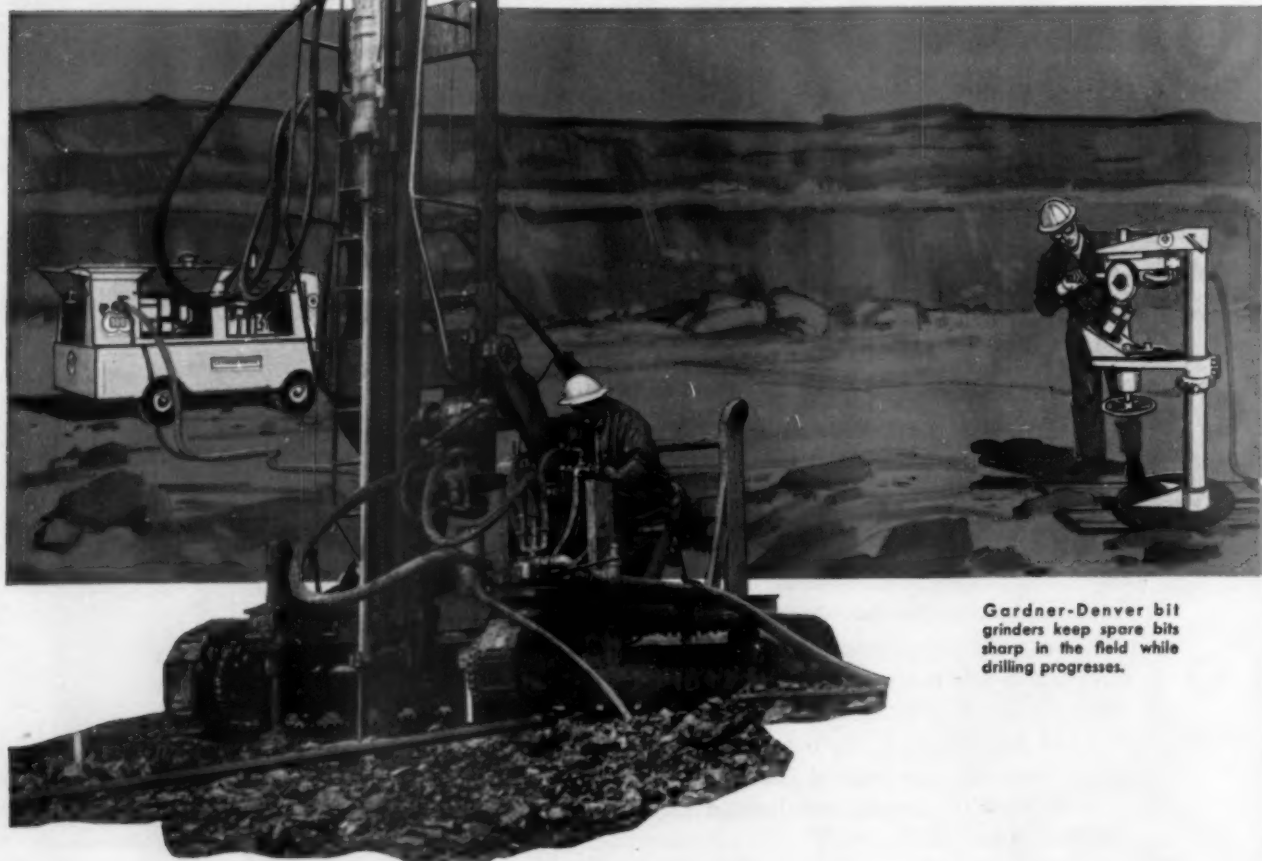
Crescent DragScrapers • Slackline and Tautline Cableways • Duro-lite Blocks

GARDNER-DENVER GOES ALL

ONE SOURCE—ONE RESPONSIBILITY COMPLETE DRILLING PACKAGES

From the bit to the tip of the mast, and all the way back to the compressor, these hard-hitting drilling rigs are completely Gardner-Denver engineered. And Gardner-Denver backs every component with its plus services.

- ① Heavy-duty, chain feed mast with high-torque piston feed motor.
- ② Independent-control power rotation rock drill.
- ③ Carburized "HI-LEED"® sectional rod and couplings.
- ④ Long-life carbide insert rock bits.



Gardner-Denver bit grinders keep spare bits sharp in the field while drilling progresses.

THE WAY TO SPEED YOUR BLAST-HOLE DRILLING

- ⑤ Accurate hole-spotting hydraulic boom and drill positioner.
- ⑥ Time-saving centralized controls.
- ⑦ Drill-preserving air line oilers.
- ⑧ Maneuverable "Air Trac"® crawler.
- ⑨ Mobile, heavy-duty HT143 crawler.
- ⑩ Sturdy mast takes 30' steel changes.
- ⑪ Hard-hitting, 5½", deep-hole drill.

**SEE YOUR GARDNER-DENVER
ROCK DRILL SPECIALIST**

New Gardner-Denver Rota-Screw portable compressors start up immediately in any weather or climate. Deliver pulsation-free air flow without compressor vibration. Slash maintenance costs because there are no blades or other touching parts in the compression chamber.



PLUS SERVICES

ARE BASIC AT GARDNER-DENVER

Sizes and models to suit job requirements • Specialists to help you choose correct equipment • Demonstrations of equipment in the field • Ready supplies of replacement parts anywhere • Trained technicians to give you mechanical help • Engineered durability and maintenance economy • Pace-setting new products to meet job demands.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Ill.—Offices in principal U.S., Canadian and Mexican cities
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 18, Ontario.

International: Gardner-Denver International Division, 233 Broadway, New York 7, N. Y.
Offices: Buenos Aires, Argentina; Artarmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal

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ROCK PRODUCTS, September, 1961

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Labor Relations

continued from page 32

If an employee is on layoff for extended time, is he still entitled to holiday pay?

What Happened: Because of poor business a number of employees were laid off. Two months later they were recalled. During the layoff two holidays came up—Memorial Day and Fourth of July. The company policy was to pay for these holidays, provided the workers showed up the day before and the day after. It had been the policy of management to pay for a holiday if an employee was laid off that week—but not for workers on layoff for a longer period of time.

When the employees returned to work after the 2-month layoff, they claimed pay for the 2 holidays. Their arguments:

1. When we were on layoff we were still "employees." That means we were covered.

2. We didn't come to work the day before and the day after the holiday because we were on layoff. So this provision does not apply to us.

The company answered:

1. A person on layoff is not a real employee. He is not subject to "direction and control of the employer."

2. Nothing in our policy calls for holiday pay for employees on layoff.

What if employees are on permanent layoff? Do they keep on collecting holiday pay? That would put a quite a burden on us.

Was the company:

Right? ☐ Wrong? ☐

What Arbitrator Tischler ruled: "Paid holidays are now a standard feature of nearly all collective bargaining contracts, and payment for unworked holidays, as well as other fringe benefits, tend to better morale of the worker and help maintain a good employer-employee relationship.

"Many Arbitrators have al-

lowed holiday pay to those who were out on layoff for a reasonable time. What is a reasonable time involved here? Reasonable time is a relative and flexible term. Considering the nature of the type of business involved, the seasonal nature of the industry and a review of the facts, we find that any employee who is out on a layoff for less than 90 days shall be entitled to holiday pay.

"Beyond that would be unreasonable time—and disqualifies an employee from receiving holiday pay. In this instance, the employees were on layoff for less than 90 days and, therefore, they are entitled to be paid for the holidays."

How can you discipline employees who take part in a slowdown?

What Happened: A six-man crew was reassigned to other work. They didn't like the change, and their production steadily decreased. Finally the crew was producing only 67 percent of the minimum production expected for incentive workers.

Foreman Howard called in the six employees individually to give them a chance to explain. The reasons given included: "the fit of the parts is sloppy"—"incentive rate is too low"—"bolts should be longer"—etc. Howard tested the materials and found them good.

As production continued to drop, the supervisor warned the men that further refusal to increase it would result in disciplinary action. The next day production fell again. Management issued a written warning, but in the following 10 days production continued to decrease until it hit a low 41 percent of normal. Howard gave the men a 5-day disciplinary layoff. The men protested:

1. The decrease in production resulted from the change in method of operations.

2. There was definitely no "intentional slowdown."

3. No crew ever made the rate set by management—and the company never changed it.

4. We gave reasons for the low production.

5. This is the first time workers have been disciplined for not meeting a proposed rate.

The company felt that its entire incentive system was threatened and made charges:

The operation is a simple one, requiring only one hour of familiarization time.

It has been regularly studied. Results showed that there should have been a substantial increase in production.

No grievance had ever been filed as to the rate.

The group was guilty of a "slowdown" because inexperienced crews had produced substantially more.

The progressive decrease in production after each warning shows that it was intentional.

Was the company:

Right? ☐ Wrong? ☐

What Arbitrator Stouffer ruled: "The evidence showed that the crew assigned to the operation during the layoff outproduced this regular crew. Such evidence convinces this arbitrator that the workers were the cause of the lowered production. The complaints made as to misfit of parts or equipment are not given much weight. It is apparent, if such were the facts, that the other shifts would have experienced the same difficulties. The grievants purposely reduced their production because of dissatisfactions. To condone their actions would be tantamount to ignoring the grievance procedure and to sanction workers taking matters into their own hands. The disciplinary layoff is upheld."

END



Why Bower makes sure straight rollers aren't really straight

Enormous loads exert crushing pressure on roller bearings—pressure that tires out even the toughest metals.

In a straight roller bearing, this pressure, or stress, builds up at the ends of the rollers. It is called edge-loading. Here, where the metal is subject to severe loads, the first signs of fatigue begin to develop. The result is invariably early bearing failure—expensive downtime for you.

It's for this reason that Bower crowns its straight rollers. Stress is distributed more evenly along the full length of the rollers. Bearings work better, last longer. It adds up to less downtime in the field for you, more of your profit stays in your pocket.

Insist on the best. Insist on Bower. Your jobber can give you full information and fast delivery. Call him today.



BOWER ROLLER BEARINGS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICH.

R/M HOMOFLEX AIR HOSE



Flexible as a Rope...

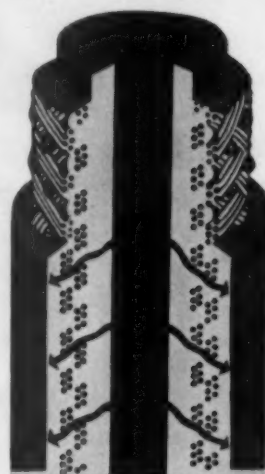
HOMOFLEX Handles Easier, Lasts Longer in Rugged Work

Only Raybestos-Manhattan offers unique Homoflex construction—to produce a hose that is super-strong yet flexible... and weighs less than any other air hose of equal working pressure.

- **SUPER-STRONG**—assures longer, trouble-free service life
- **PRECISION BUILT**—with super-strength, low-stretch cords
- **MANDREL-MADE**—no pre-set twist
- **KINKLESS**—coils and uncoils freely in any direction
- **HOMOGENEOUS CONSTRUCTION**—provides inseparable tube-to-cover bond
- **SAFER, EASIER TO COUPLE**—inside and outside diameters are uniform

Homoflex H. D. Air Hose is also available for extra heavy duty and with *yellow cover stripe* for visibility; also in type for water in mine use. Let your R/M distributor show you how to get More Use per Dollar with R/M hose. Write for Catalog M5.

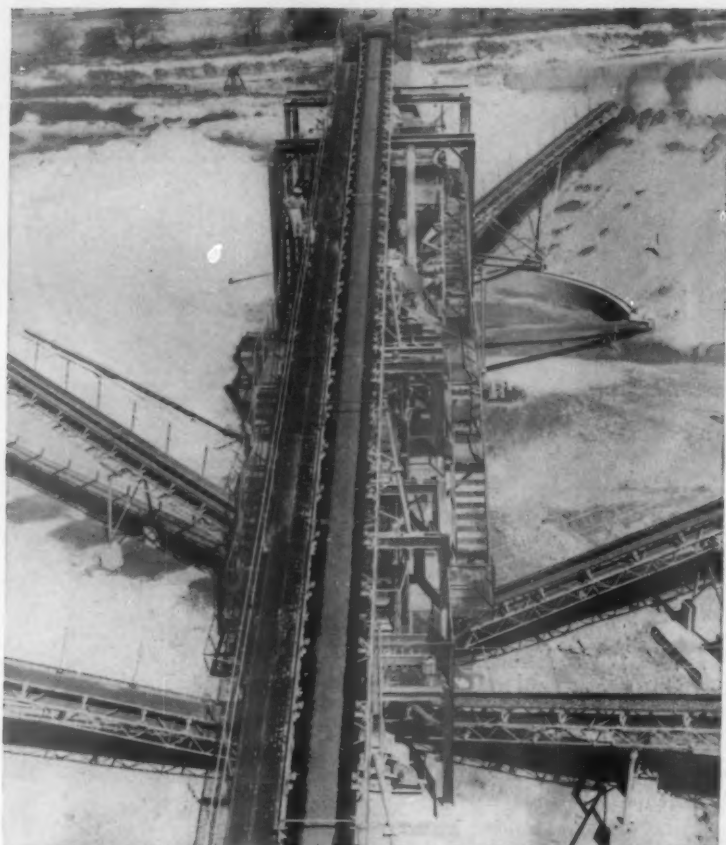
STRONG—LIGHT—KINKLESS



EXCLUSIVE HOMOFLEX CONSTRUCTION makes strength member and tube virtually inseparable for long, trouble-free service. Uniform inside and outside diameters permit faster, safer, easier coupling—faster, fuller flow.



RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION • PASSAIC, N. J.
ENGINEERED RUBBER PRODUCTS



RAY-MAN Conveyor Belt Troughs Deeper, Trains Easier

Ray-Man construction meets the performance requirements for Cantwell Machinery Company conveyors at Marble Cliff Quarries Company's Arrow Sand and Gravel Plant, Columbus, Ohio. Ray-Man has the flexibility and troughability to haul fuller loads—even with small pulleys, reverse bends, snub or take-up pulleys. No breaker is required . . . and Ray-Man holds fasteners. Also has exclusive XDC Cover for longer life.

- **HIGH COVER-ADHESION ALL AROUND**—top, bottom, and edges
- **FULL COVER THICKNESS USED**—no breaker needed—longer cover life
- **SPICES LAST LONGER**—hold fasteners better
- **MORE TROUGHABLE AND TRAINABLE**—highly flexible, double compensated
- **IDEAL FOR 45° IDLERS**—guaranteed against separation at idler hinge line
- **OPERATES ON SMALLER PULLEYS**
- **IMPACT CUSHIONED**—resists ripping

ASK YOUR R/M DISTRIBUTOR ABOUT THE ADVANTAGES OF RAY-MAN FOR YOUR INSTALLATION.

Write for Bulletin M302.

R/M Poly-V[®] Drive Delivers More Power in Less Space ... With More Reliability

A single, endless V-ribbed belt across full width of sheaves with mating grooves. Gives more power per inch of width and advantages never possible with conventional multiple belt drives.

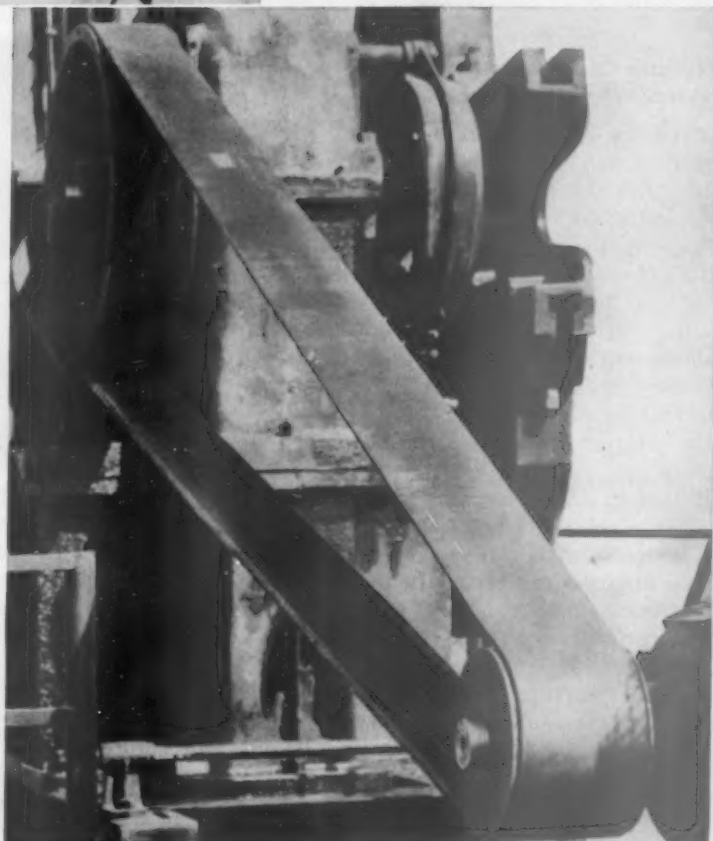
- **SIMPLICITY**—two belt cross sections meet every heavy duty requirement
- **RELIABILITY**—less maintenance, less take-ups . . . longer belt and sheave life
- **NO MATCHING**—single unit belt eliminates "length matching"
- **BETTER PERFORMANCE**—maintains groove shape, constant pitch and speed ratios . . . runs smoother, cooler

WHEN YOU CHANGE DRIVES CONVERT TO POLY-V*... AND BE SURE.

Write for Bulletin M141.

*patented

RM121



PEOPLE IN THE NEWS



John Mathis elected Lone Star president

John H. Mathis, formerly executive vice president and corporate secretary, was elected president and a director of Lone Star Cement Corp., New York, N.Y., at a recent meeting of the board of directors. H. A. Sawyer, who has served as chairman and president since January 1959 and president since May 1952, was re-elected chairman of the board and chief executive officer.

Mr. Mathis, a graduate of Columbia University, attended Har-



Stanton Walker named to ASTM honorary membership

Stanton Walker, director of engineering, National Sand and Gravel Association and National Ready Mixed Concrete Association, Washington, D.C., was recently named to honorary membership in the American Society for Testing Materials, in recognition of his long service to the Society in both technical and administrative activities, and particularly for his work in the field of cement and concrete.

William Karl appointed Nytralite vice president

William W. Karl has been appointed vice president of Nytralite Aggregate, Inc., newly formed subsidiary of New York Trap Rock Corp., West Nyack, N.Y. He was formerly president of Lehigh Materials Co., subsidiary of Warner Co. Mr. Karl at present is assisting Paul M. Hedley, president of Nytralite, in making preliminary plans for the erection of a new \$2 million plant on Rondout Creek near Kingston, N.Y.

Mr. Karl, a graduate of Duke University with a BS degree in civil engineering, joined Lehigh Materials Co., Tamaqua, Pa., in 1955 as sales manager developing the use of lightweight aggregate in structural concrete. The firm became a subsidiary of Warner Co. in 1957 and two years later Mr. Karl was named president. Prior to that he was manager of M. F. Hickey Co.



vard Law School and the University of Oklahoma Law School. He has been an officer of Lone Star for 15 years. He was corporate secretary from 1946 to 1952; vice president and secretary from 1952 to 1958, and executive vice president and secretary since 1958.

J. F. Clyne, Jr., was named to succeed Mr. Mathis as corporate secretary.

On NCSA Manufacturers Board

Ernest E. Haupt has been elected to the board of directors, Manufacturers Division of the National Crushed Stone Association. Mr. Haupt is manager of sales development and national accounts for B. F. Goodrich Industrial Products Co., Akron, Ohio.

Please turn to page 42



19 tons of sub-base material loaded in 1.4 minutes!

To be exact, 19.75 tons of 3000 lb./yd. material loaded in that truck in 1.4 minutes. No one-time-only shot either. Another example: five trucks loaded out one after the other in 1.3 minutes each with an average of 17 tons per truck. That's routine production for the Caterpillar 966 with 2¾ yd. bucket at the Nello L. Teer quarry near Durham, N. C.

Can your loader match that? This 966 operator said, "I can load up to 100 tons an hour *more* with the 966 than with our other loader with a bigger bucket."

Reasons: "It's the fast lift and drop of the bucket, fast steering and short turning radius, fast power shift transmission and the automatic bucket positioners." There are hard mechanical reasons behind that performance testimony. The hydraulic system is fast because the pump is driven directly from the engine, is little affected by the load on the drive train. Finger-touch power shift transmission shifts from forward to reverse, first and second, almost instantly and *smoothly*.

If low production is your big problem, talk to your Caterpillar Dealer. Take a look at the Caterpillar line of wheel loaders—80 HP 922, 105 HP 944 and the 140 HP 966 (all flywheel ratings) . . . bucket sizes from 1¼ to 4 yd. Try a Cat loader on your job, see the easy operation, check the production, remember Cat dependability. Do you know anything that can beat that combination?

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.



WHY THE BUCKET'S FASTER: It's going up automatically, will stop and hold at full height—while the operator is backing out and pulling up to the truck. After the load is dumped automatic bucket positioners take over again and tilt the bucket back to proper digging angle—and the operator is free to maneuver the loader. It's all part of the fast-operating control system—power-boosted steering and brakes, power shift transmission.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**CAT WHEEL LOADERS
ARE SETTING NEW
PRODUCTION RECORDS**

People in the News

continued from page 40



Taylor succeeds Hegan as head of Ohio River Sand

Allen P. Taylor was recently elected president of the Ohio River Sand Co., Louisville, Ky., to succeed Chester P. Hegan, who was named chairman of the board. Mr. Taylor has been with the company since 1952.

Harry C. Aldrich, treasurer for the past six years, was elected vice president and treasurer; J. E. Rankin, division sales manager, was elected secretary.

Frank L. Lovell, sales manager for the past three years, was named vice president, filling a vacancy created by the death of Homer L. Baker.

New York Trap Rock names new production manager

Rush Muse has been appointed production manager for New York Trap Rock Corp., West Nyack, N.Y. He fills the post formerly held by Henry J. Schwelmbach, vice president of production. A graduate of the Texas College of Mines and Metallurgy with a BS degree in mining, Mr. Muse has been serving as general superintendent-mines plant.

Bestwall Gypsum elects O. F. Grieve vice president

O. F. Grieve, general manager of manufacturing, Bestwall Gypsum Co., Ardmore, Pa., has been elected vice president of the company. Mr. Grieve, who has been in charge of manufacturing operations for 10 gypsum mines and plants throughout the United States, joined the parent company of Bestwall, Certain-teed Products Corp., in 1924. For the next seven years he served as supervisor of manufacturing in the Grand Rapids, Mich., plant, and later was appointed plant manager and then production manager of the gypsum division. He became production manager of Bestwall Gypsum in 1956 and was promoted to general manager of manufacturing.

PCA appoints Riefenstahl Accident Committee chairman

Howard Riefenstahl, manager of safety and training for Alpha Portland Cement Co., Easton, Pa., has been appointed chairman of the Accident Prevention Committee of the Portland Cement Association. Mr. Riefenstahl succeeds R. M. Cox, executive vice president of Ash Grove Lime and Portland Cement Co., Kansas City, Mo., who has served as chairman for the past two years. Mr. Cox remains a member of the committee.

Federal Crushed Stone elects new president

Gerald S. Snyder, executive vice president, was recently elected president of Federal Crushed Stone Corp., Buffalo, N.Y., succeeding H. N. Snyder, who continues as a member of the board of directors.

All directors and the following officers were re-elected: Mark Kyler, vice president; Paul J. Kremer, secretary and treasurer, and Richard G. Strickland, assistant secretary and assistant treasurer.



Louisville names personnel director

Walter E. Crowther has been named director of personnel for Louisville Cement Co., Louisville, Ky. A native of Beaver, Pa., and a graduate of Marshall College, Mr. Crowther was formerly personnel director of Western Machinery Co., San Francisco, Calif.

Louisville Cement elects Frank Lovell vice president

Frank L. Lovell has been elected vice president of the Louisville Cement Co., Louisville, Ky. He succeeds Homer L. Baker, who passed away recently. Formerly sales manager, Mr. Lovell joined the company as a salesman in 1940. He became assistant sales manager in 1954 and sales manager in 1958.

Narramore new president of N.Y.S.A.E.

Marve Narramore, managing director of the Perlite Institute, Inc., New York, N.Y., was recently elected president of the New York Society of Association of Executives, representing more than 400 trade association executives in Metropolitan N. Y.

Please turn to page 44

When you can make
a better

PROFIT

...why put up
with this

LOSS?

83,000,000 TONS
A YEAR NOW SCREENED
ON CONVERTA-SCREEN
VIBRATORS

CONVERTA-SCREEN

HEATING SPEEDS PRODUCTION...ENDS "BLINDING"
LOSS...AND DELIVERS EVERY TON TO SPECIFICATION

Electrically heated screens are no novelty, but peak efficiency has been reached economically only with the modern CONVERTA-SCREEN design.

CONVERTA-SCREEN HEATING maintains a specified particle size, an absolute "must" for firms which guarantee to supply materials of unvarying quality.

PLANT OPERATION in general is improved when CONVERTA-SCREEN helps you get closer coordination of crushing and screening.

In less than a day, the average screen can be electrified with CONVERTA-SCREEN equipment. **WRITE TODAY TO ARRANGE A TRIAL INSTALLATION ON ANY VIBRATING SCREEN IN YOUR PLANT!**

SCREEN HEATING

Transformers
INCORPORATED

428 Erie St. South • MASSILLON, OHIO

Enter 1286 on Reader Card

Guarantee Bond
ON USED EQUIPMENT

Know All Men by these Presents,

that _____
of _____ (hereinafter called Seller),
is and lawfully bound unto _____
(hereinafter called Buyer)
in the sum of not exceeding the sum of TEN THOUSAND DOLLARS (\$10,000.00),
or Seller pays for the latter described used equipment, for the payment of which
Seller hereby binds itself, its successors and assigns jointly by these presents.

The Covenants of this Obligation is such that *Whereas* Seller has sold to Buyer the herein-
described used equipment originally manufactured by Caterpillar Tractor Co. or any of
its subsidiaries:

Description _____
Model No. _____
Serial No. _____

together with certain attachments affixed thereto, and

Whereas Seller guarantees said equipment and attachments against unconditional performance
due to defective parts for _____ days after the date of sale shown
below herein referred to as the guarantee period, the obligation under this guarantee being
only to replace any parts which prove defective under conditions of normal use during
the guarantee period at seller's expense (including cost of all necessary materials and labor)
up to a maximum of the sum of Ten Thousand Dollars (\$10,000.00), or Seller's price
for said equipment, except that the cost, if any, of transporting said used equipment and/or
attachments from and to the Seller's place of business shall be paid by the Buyer.

Now, Therefore, if Seller, its successors and assigns shall at all requests well and truly perform
the obligation under the guarantee recited above, then this obligation shall be void, other-
wise to remain in full force and effect.

**THE ABOVE GUARANTEE IS VOID, AND SELLER SHALL BE UNDER NO OBLIGATION
THEREUNDER, IF CLAIM IS NOT MADE TO THE SELLER WITHIN THIRTY (30) DAYS
AFTER DISCOVERY OF THE DEFECT UPON WHICH THE CLAIM IS BASED.**

No guarantee is made or contracted to be made by Seller other than that above set forth.

WITNESS my hand and seal: _____ 1964

Signed by your Caterpillar Dealer, this bond gives you up to \$10,000 worth of machine dependability



Bonded Buy means guaranteed machine dependability. You can get a completely-checked, used Cat-built machine that has the Cat Dealer's confidence and guarantee, PLUS this bond from Lumbermens Mutual

Casualty Company that backs up your machine with as much as \$10,000 worth of parts and labor for the period you and the dealer agree upon.

See your dealer. Read the bond. Check the details. This guarantee can apply on your next used machine. And you pay no extra premium for this assurance. Dependable Bonded-Buy machines are priced right—and your Cat Dealer offers terms to match your needs. Call him or see him soon. Do business with the man whose business is built on dependability.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

People in the News

continued from page 42



Radford Limestone manager

Walter B. Bobbitt, manager of the Radford Limestone Co., Inc., New York, N.Y., which was recently purchased by the Radford Stone Corp., Radford, Va., has spent more than 30 years of his life with the company. He went to Radford in 1930 when the limestone company was acquired by the American Electric Power Co. He had been in the stone business since shortly after the turn of the century, and managed quarries in Wisconsin, West Virginia and Virginia. In 1935, five years after joining Radford, Mr. Bobbitt developed a workable stone sand for the construction industry that would reduce construction costs, increase efficiency, and create a stronger binding concrete. He wrote an article on this subject for ROCK PRODUCTS, April, 1938, describing operations at Radford Limestone Co. After this article appeared Mr. Bobbitt received requests for samples and information about his sand from all over the country, and is still receiving requests.

Mr. Bobbitt is at present vice president of the Virginia Aggregate Association, and has been a member of the National Crushed Stone Association for 35 years.

New officers of the Radford Limestone Co. are G. A. DeWitt, president; W. A. Easton, vice president; M. L. Easton, secretary; and B. R. DeWitt, treasurer. H. E. Williams is the present superintendent.

Please turn to page 46

How Union-Camp's 5-Star Plan saved multiwall user up to \$450 per carload of bags

This is a new kind of "Big-Inch" story.

A major mid-west packer* wasn't convinced his multiwall bagging operation was all it might be. Could Union-Camp's 5-Star Multiwall Plan help?

To get the answer, Union-Camp multiwall specialists visited the plant. They found that the automatically filled bags occasionally stuck in the sewing head. Also, that the sewing line tended to "belly" and form an arc pattern. The result was considerable loss in production and frequent breakage. Another problem—the bags didn't warehouse well.

"Sew-Straight" Solution

After completing their analysis, the Union-Camp men suggested installing a "Sew-Straight" attachment right onto the sewing head. The bags could now be closed with an "E" head in a perfectly straight line. And only 1 inch from the top of the bag. That single inch made all the difference.

Less paper—less breakage

To begin with, shorter bags could be used. The savings in paper alone cut

the firm's multiwall costs from between \$350 to \$450 a carload. Imagine the savings based on several dozen carloads a year!



Before and After. Old, semi-circular closure pattern (left) and the new closure (arrow). Note the straight sewing line, and how close it is to the top of the bag.

The new attachment also speeded production by eliminating sewing head jam-ups. Moreover, since the top closure is now identical to the factory-sewn bottom closure, the bags form a perfect pillow shape—no awkward ears. This makes them easier to handle . . . easier to stack. And there's less breakage and fewer rejects.

How much could you save?

Perhaps an idea unearthed through Union-Camp's 5-Star Plan could save you money. The chances are excellent. For every day, multiwall users, large and small, are reducing their multiwall costs by capitalizing on this comprehensive packaging service. Their savings run from a few thousand dollars to over \$100,000 a year.

Apart from bag construction, this economy program covers bag design, specifications control, packaging machinery, and a survey of your materials handling operation. And it costs you nothing—regardless of the brand of bags you now use.

FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.

 **UNION-CAMP®**
MULTIWALL BAGS
Union Bag-Camp Paper Corporation, 233 Broadway, N.Y. 7, N.Y.

* NAME ON REQUEST

STABILITY MOBILITY VERSATILITY EASY OPERATION

4 reasons why operators prefer the ALL-NEW, ALL-HYDRAULIC 350 REICHdrill

CRAWLER-MOUNTED C-350



NOMINAL HOLE SIZE—1 1/2" to 5 1/2" • DOWN PRESSURE—10,000 LBS. • ROTARY SPEED TO 540 RPM

Easy Operation is assured by all-hydraulic, labor-saving controls. *Stability* is provided by 14" wide tracks, low center of gravity and 8'8" wide frame plus 3 REICH heavy-duty hydraulic leveling jacks. *Mobility* is high because the crawler-mounted 350 trams at 7.8 MPH; climbs 25% grades, turns in its own length. *Versatility* is basic in REICHdrill design. The 350 is at home blastholing with 3-cone rotary bits, In-Hole Drills, or drag bits; coring or prospecting.

A truck-mounted T-350 REICHdrill for greater mobility with all the above advantages, is also available. Get detailed specifications.

Ask for SP-5001-2



REICH

FRANKLIN (VENANGO COUNTY), PENNA.

Division: CHICAGO PNEUMATIC TOOL CO.



People in the News

continued from page 44

OBITUARIES

Otto L. Pelham, assistant secretary-treasurer of the Florida Portland Cement Div. of General Portland Cement Co., Tampa, Fla., died suddenly on July 21. He was 64 years old and had been associated with the cement company since 1926.

George H. Rhinehart, well known throughout the asbestos industry, passed away in Puerto Rico on June 20. Mr. Rhinehart started his association with the asbestos industry when he joined Asbestos Ltd. in 1941. Six years later he formed George H. Rhinehart, Inc., and acted as an agent for special territories for Asbestos Corp. Ltd.

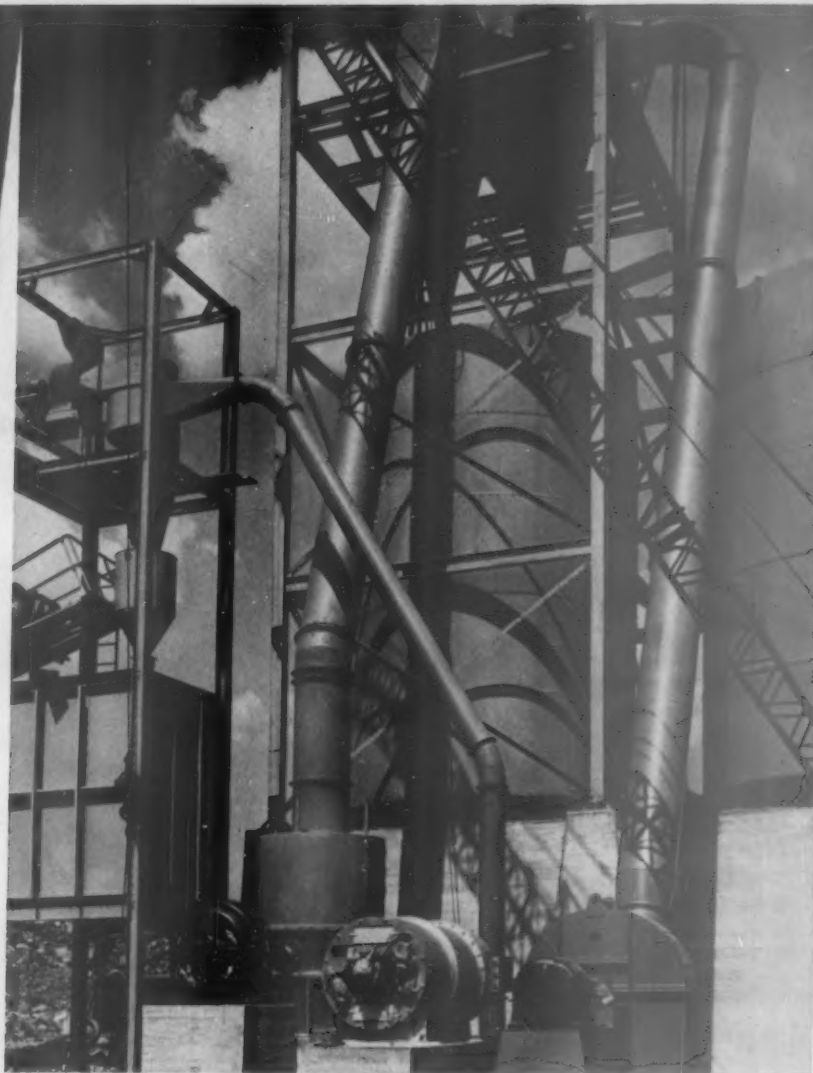
Fred F. Loy, district engineer of the Portland Cement Association's Iowa district, died suddenly on July 3 at Clear Lake, Iowa. He was 55 years old. Mr. Loy had been associated with PCA since 1937, starting as general field engineer in its Des Moines district office.

Raymond H. Lutz, president of the Edward Lutz Sand & Gravel Co., Inc., Milwaukee, Wis., died recently after a long illness. He was 50 years of age. A native of Milwaukee, Mr. Lutz had been associated with the sand and gravel firm for 32 years. He served as secretary-treasurer before becoming president in 1946.

Arnold Hoke, retired vice president of operations, Whitehall Cement Manufacturing Co., Philadelphia, Pa., died recently. He was 83 years of age and had been associated with Whitehall for 45 years.

END

BRADLEY EQUIPMENT
 • MILL AND SEPARATOR
 HEATER FOR DRYING
 by Todd Shippens Corporation
 • MILL FAN
 • PRIMARY CYCLONE
 COLLECTORS
 • VIBRATORY TYPE FEEDER
 • FEED CONTROL
 DUCTING:
 Fan to Mill
 Mill to Cyclone Collectors
 Cyclone Collectors to Fan
 Vent to Secondary Collectors
 by Buell Engineering Co., Inc.
 Northern Blower Division



22 TONS-PER-HOUR AG-LIME AT 98% PASSING 20 MESH

Typical of Bradley work in the grinding field is this Pneumatic Hercules Mill installation at the Pine Creek Plant of Lycoming Silica Sand Company, Montoursville, Pa.

The installation takes Limestone of 2" maximum down to dust and containing, at times, as high as 10 to 12% moisture. The Bradley Mill System produces from this feed 22 tons-per-hour of finished material, with a fineness of 98.5% minus 20 mesh,

72 to 75% minus 100 mesh, containing approximately 1% moisture.

Bradley manufactures a full range of Pneumatic Mills with or without Flash Drying for finenesses up to 325 mesh... plus Bradley Hercules Screen-Type Mills to handle your semi-fine pulverizing requirements.

Bradley will test-grind your materials in their grinding facilities at Allentown, Pa. *without cost.* Write for details.

See Chemical Engineering Catalog or write for Bradley Catalog No. 63



**BRADLEY
 PULVERIZER COMPANY**

LONDON • ALLENTOWN, PA. • BOSTON

Superior Grinding Equipment Since 1891

TD-25 outproduces '24'
New Power advantages
high-walling—*for Morris Enterprises,*



by 20%... speed

Owensboro, Ky.



"The new International TD-25 is giving us about 20% more production than our TD-24," states Paul H. Morris, owner of Morris Enterprises, Owensboro, Kentucky. "The '25's' DT-817 turbocharged Diesel is snappy, doesn't lug down, and has the power to carry full loads without hesitation.

"I particularly like my '25's' Planet Power steering and Hi-Lo power-shifting advantages for high-wall cutting—and the good balance, which enables backing up steep grades and starting the push immediately.

"My TD-24 has clocked better than 10,000 production hours in four years, with outstanding service and very low downtime."

Full-cut benching—full time

Apply full power to the job—maintain full speed—keep the blade loaded full time—benching or highwalling with the International TD-25. You simply operate the bankside track in high speed range, the other in low speed range—for full-capacity straight ahead performance, without "fish-tailing" or "bank-nosing."

You make full-load, full-power turns with TD-25 "live-track" Planet Power steering. And with combined Hi-Lo power shifting, you get instant up-or-down matching of power to condition. You eliminate "dead-track drag" and "gear-shift" lag—and benefit accordingly.

See how the 230-hp TD-25 outproduces king-sized clutch-steered rigs by up to 50%, or more—clearing land, removing overburden, highwalling, and benching. Compare DT-817 turbocharged Diesel wallop—measure how dual-valving insures "free breathing" for clean combustion and big work capacity at all altitudes. Let your International Construction Equipment Distributor demonstrate.

◀ **"Slugging" straight ahead** with an offset load of shot rock, this TD-25, belonging to Morris Enterprises, demonstrates the capacity-adding Planet Power steering principle. Operator keeps bank-side track in high range, leaves other in low range, to stay on course, with full power "harnessed." This producer removes about half of a 35' overburden with crawlers—takes off the balance with dragline.



**International[®]
Construction
Equipment**

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

INDUSTRY NEWS

With \$72 million, Huron plant plans doubling record capacity



New 147-ft. storage silos topped by dust collectors make an impressive sight

The 12-million bbl. per yr. Alpena, Mich., plant of Huron Portland Cement Co.—believed to be the largest of its kind in the world—is undergoing an extensive facelifting and expansion program to the tune of \$72 million. Already 28 new 14-story silos have been added, along with a dock, slip, loading equipment, grinding mill and raw material handling system. By next summer there will be another rotary kiln, boosting annual production to 14 million bbl., and an additional crushing-drying system.

By 1963, Huron will add a seventh ship to its fleet transporting cement from the Alpena plant to terminals around the Great Lakes. The new member is a former ocean-going oil tanker being converted into a cement and coal carrier. With its 55,000 bbl. capacity, it will be the largest cement carrier on the Lakes.

The thirteenth in the Huron family of distributing plants is in prospect for Waukegan, Ill. This 150,000-bbl. terminal will be located adjacent to the large gypsum products plant of the parent company, National Gypsum Company.

National Gypsum Co. acquired Huron Portland Cement Co. in 1959. All Huron production is based at the Alpena plant, where abundant supplies of limestone and shale are convenient. Since World War II, Huron has boosted annual capacity 200 percent with an investment of \$56 million.

Looking toward a thriving and profitable future, National Gypsum Co. Chairman of the Board

Please turn to page 54

**maintenance costs
eat into profits!**

EAGLE EQUIPMENT IS DESIGNED FOR MINIMUM MAINTENANCE!

for example:

TOTALLY ENCLOSED GEAR DRIVE

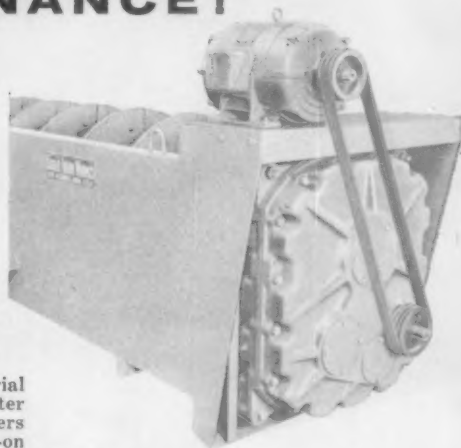
All Eagle Washers have a totally enclosed gear drive—gears run in oil bath and are sealed against water, dust and dirt—give far greater service life—require far less attention than open gears. Gears are helical, made of steel, have cut-teeth and are flame-hardened. Each gear is supported on both sides with anti-friction bearings.

for example:

CAST BOLTED-ON FLIGHTS PRO- TECTED BY SHOES

Eagle Single Screw Fine Material Washers 20" and 22" in diameter and all Coarse Material Washers have sectional, cast iron bolted-on flights, as shown at left. These screw flights are protected by replaceable shoes which overlap the flights to protect all surfaces where abrasion is most severe. These shoes, which are standard equipment, are made of Ni-Hard chrome-nickel iron alloy which is highly resistant to wear. This feature greatly reduces maintenance costs.

In the case of Coarse Material Washers, cast bolted-on flights have proved most suitable and permit any screw flights in the line to be replaced with paddles when greater abrading and scrubbing action is required in a particular section of the tub.



for example:

SPIRAL WELDED SCREW PROTECTED BY SHOES

All Eagle fine material washers 24" screw diameter and up are equipped with welded Screws protected by replaceable shoes. Surfaces of the Screw that are subjected to abrasive wear are protected by these segmental shoes which are bolted in place. They are made of Ni-Hard. These shoes are mounted on the up-bound side of the screw; as shown at right. They lap over the edge of the screw to afford full protection and wear life. Any loss in screw diameter reduces production—Eagle's easily replaced shoes prevent production losses. This is just one of many features designed to minimize maintenance.

for example:

LOG WASHER PADDLES PROTECTED BY SHOES

The paddles on Eagle Log Washers have replaceable Ni-Hard alloy iron shoes. The shoes are corrugated to increase the scrubbing action. An additional bonus from Eagle engineers is the 2-piece design of these shoes. The upper part of the shoe, which receives the brunt of the wear, can be replaced when necessary without need for replacing the entire shoe.

Other maintenance cost cutters include the stainless steel wear sleeves supplied with all Hydrotex water-lubricated bearings, Eagle's outboard bearings for use where lack of water exists, Ni-Hard liners for splitter gates and flumes on high tonnage Eagle Water Scalping-Classifying Tanks, Ni-Hard wear-resistant rollers and heat-treated steel pins on the traveling chain of Eagle "Swintek" Dredging Ladders—to name a few. Eagle's distributors' servicemen are factory-trained to help users cut maintenance costs—Eagle Factory Servicemen are also always available when needed. Eagle offers quick private airplane service with minimum time on the job, when needed to trim Eagle equipment. Yes, Eagle equipment requires less service, but help is right there when you need it. Send for Catalog 61—shows why Eagle Washers are always better all ways!

SINCE 1872

EIW
EAGLE IRON
WORKS

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

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DUMP CYLINDERS STAY OUT OF THE DIRT

On all Allis-Chalmers tractor loaders dump cylinders are placed near the center of gravity, out of the dirt and grit that can score piston rods . . . damage entire hydraulic system.

Instead of mounting dump cylinders on the bucket, Allis-Chalmers puts them up and away from abrasives that can cause scoring of piston rods or get into vital hydraulic components and ruin the entire system. In addition, this dump cylinder location brings greater loader stability . . . no extra weight to lift with bucket . . . fewer moving parts.

Other tractor loader advantages you'll like are: *Single lever speed and direction control*; *pin-connected axles* that hold tight under load; *extra stability* from extra-long wheelbase; *high lift—added reach* for fast, even dumping even into side-boarded trucks; and *5-way hydraulic filtering* protection that means less downtime . . . extended loader life.

Watch Allis-Chalmers loaders at work. Be convinced of their many design and construction advantages that improve your profit picture. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Allis-Chalmers offers 6 tractor loader models—ranging in power from 76.5 to 184 horsepower—in carry capacity from 3,600 to 10,500 lb and with buckets available from 1 to 6 cu yd.

STEP UP YOUR

Performance
Operator comfort
Pearability
Ease of maintenance
Reliability



WITH **ALLIS-CHALMERS**
POWER FOR A GROWING WORLD

Industry News

continued from page 50

Melvin H. Baker has announced intentions to "eventually cover the U. S. with a network of cement plants as we covered the nation with gypsum and other plants."

Iowa State professor creates foamed asphalt

Research undertaken by Ladis H. Csanyi, Professor in Charge of the Bituminous Research Laboratory of Iowa State College, has developed a foamed asphalt process which results in more thorough aggregate mixing and might eventually lower highway construction costs.

Asphalt cement is introduced into a nozzle at 280 deg. F. or over and at approximately 25 lb. pressure. At the same time, saturated steam is introduced at about 40 lb. pressure. Asphalt foam is instantaneously generated when the two meet in the inside tip of the nozzle.

The foamed asphalt becomes softer at lower temperatures, has greater powers of adhesion, and increases in volume. It is more uniformly distributed through aggregates during the mixing process. Successful tests have been made using limestone fines; this could prove very economical for highway use in areas where they are surplus.

Cement producers give trucking a firm boost

In Mason City, Iowa, two trucking outfits are looking forward to the day when their payroll roster may be upped to over 100 men. The reason for this healthy rise is that two firms, Northwestern States Portland Cement Co. and Lehigh Portland Cement Co., have switched a large portion of their cement hauling operations from railroad to trucks.

ASTM picks '61-'62 officers

During the 64th Annual Meeting of the American Society for Testing Materials, new national officers were elected and six men added to the board of directors for three-year terms.

Miles N. Clair (left) will serve



as president during the next year. President of The Thompson & Lichtner Co., Inc., Brookline, Mass., he is noted for his contributions to the ASTM committees on cement, concrete and concrete aggregates, and soils for engineering purposes. He and his firm have done much to develop the use of concrete made with fine and coarse cinders and lightweight concrete roof slabs.

Vice President is Alfred C. Webber (right), assistant to the laboratory director, Research and Development Division, E. I. duPont de Nemours & Co., Inc., Wilmington, Del. Plastics and polychemicals are Mr. Webber's specialty: he also has been a long-time contributor to science education. R. Wade Seniff, manager of research, Baltimore & Ohio Railroad Co., Baltimore, Md., continues as senior vice president.

The new board members are: Ardrey M. Bounds, chief metallurgist, Superior Tube Co., Norristown, Pa.; Albert G. H. Dietz, professor of building engineering, Massachusetts Institute of Technology, Cambridge, Mass.; Bruce W. Gonser, technical director, Battelle Memorial Institute, Columbus, Ohio; Wayne A. Kirklin, manager, Analytical Division, Hercules Powder Co., Wil-

ilmington, Del.; Gordon M. Kline, chief, Organic and Fibrous Materials Division, National Bureau of Standards, Washington, D.C., and James B. Rather, Jr., coordinator in charge of toxicology and air and water pollution, Soco Mobil Oil Co., Inc., New York City.

Additional important business conducted at the meeting was the changing of the Society's name to the more widely inclusive American Society for Testing and Materials.

Canadians hit jackpot with "fool's gold"

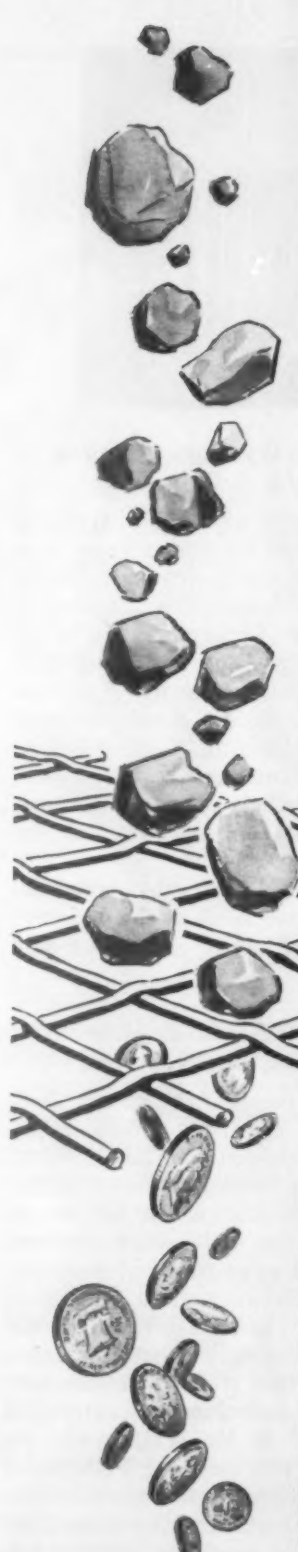
"Fool's gold"—really flake mica—is being mined commercially in Yellowhead Pass near Jasper, Alberta by Georgian Mineral Industries Ltd.

The company is planning to set up a second plant for the production of powdered mica, which finds its way into such varied products as concrete block and greeting cards. At present, most of the 5,000 tons of flake mica consumed annually by the Canadian market is imported from the U. S.

Mining Engineers add geological unit

The Society of Mining Engineers of AIME recently established the Geological Engineering Unit Committee of the Mining and Exploration Division. Headed by Dr. Shirley A. Lynch, chairman of the department of Geology and Geophysics, Agricultural and Mechanical College of Texas, College Station, the Committee hopes to develop into a division of the Society in its own right. It has already organized a session of technical papers to be presented at the 91st Annual AIME Meeting next February.

Please turn to page 56



To increase your screening profits

SPECIFY IOWEAVE SCREEN CLOTH FOR EVERY SCREEN

It's quality-built by

Cedarapids

Built by
IOWA

TO INCREASE CAPACITY WITH LOWER COST PER TON

With the tough, special analysis oil tempered wire used in loweave screen cloth, we can use a lighter gauge for specified openings, giving your screen more openings per square foot. The resultant higher hourly capacity with no extra operating expense adds up to lower cost per ton.

TO INSURE ACCURATE GRADATION

Openings cannot vary or work loose under severest vibration because of loweave's tight weaving and positive lock at wire intersections. Correct opening sizes and proper tension are maintained throughout the long life of the cloth, assuring exact sizing of all products.

TO LAST LONGER WITH LOWER MAINTENANCE

loweave screen cloth is cut square. Measurements taken from the center of the screen assure perfect uniformity of the edges to equalize tension under tight stretching and prevent wire breakage. And with its great resistance to abrasive wear and fatigue, loweave requires changing less often than other brands.

WHY CEDARAPIDS MAKES ITS OWN SCREEN CLOTH

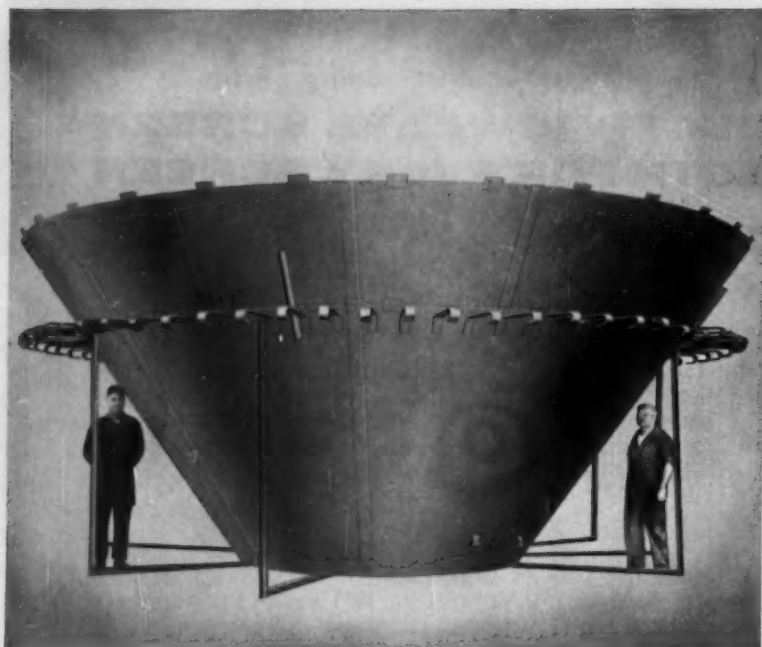
At Cedarapids, greatest emphasis is placed upon precise quality control through every step of manufacture. Since 1943 we have been making loweave screen cloth in our factory to be sure that Cedarapids screens will give you the quality performance that cuts costs and increases profits.

With our complete control of screen cloth manufacture we can maintain large inventories of standard sizes at Dealer establishments, our area warehouses, and the factory. Whether you own a Cedarapids screen or any other make, your order for top quality loweave screen cloth will be filled promptly. For special requirements, we can quickly weave special cloth to your specifications.

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WRITE FOR THESE BULLETINS TODAY*

**IOWA MANUFACTURING
COMPANY**
Cedar Rapids, Iowa





K & B custom fabrications for the concrete industry



- Serving the nation's leading manufacturers for over 50 years
- Complete facilities in sheet, plate and structurals
- 170,000 sq. ft. plant with crane capacity up to 25 tons

Write for your copy of the K & B 40-page Fabrication Catalog or send your specifications for prompt quotation.

The Kirk & Blum Manufacturing Co.
3210 Forrer St., Cincinnati 9, Ohio

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SWITCH VALVES, WELDED PLATE • CHUTES • BREECHINGS
STACKS • DUST COLLECTING SYSTEMS

KIRK & BLUM

Enter 1225 on Reader Card

Industry News

continued from page 54



Chicago skyscraper rising as home of U. S. Gypsum Co.

By early 1963, U. S. Gypsum Co. should be able to move into its new headquarters in downtown Chicago. The diagonally-situated 17-story building is being designed by Perkins & Will, on a site large enough to provide for a street-level plaza surrounding the building. Four white masonry columns with a black spandrel area between each floor form a facade on each side of the building.

U. S. Gypsum offices will occupy the top floors of the building; the rest will be available rental space.

New Mexico funds withheld, contracts, bids prohibited

As a result of the Blatnik Committee hearings, Federal Highway Administrator Rex M. Whitton has ordered the withholding of authorization for bid advertising for Federal-aid projects, as well as approval of contracts for previously authorized projects. To get the green light the State Highway Department must prove that it can maintain adequate control over construction operations. Mr. Whitton also ordered the delay of Federal-aid fund payment for operations in which certain contracting firms or state employees participated.

Please turn to page 59

Special report to users of Caterpillar equipment:



Parts you can trust
...cost less per hour

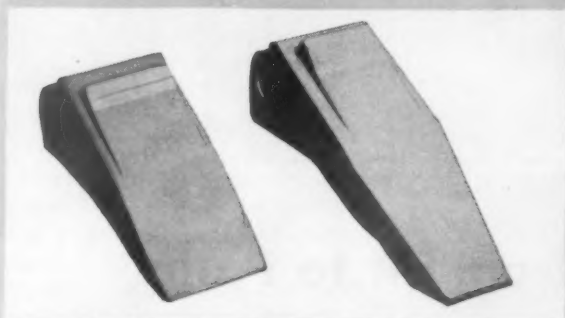
New Cat No. 8 and No. 9 Ripper Tips

outproduce other brands 25 to 50% in field tests

That's the kind of news you can use—to cut costs. This newcomer to the Caterpillar line of ground-engaging tools is making a name for itself with cost-conscious users.

They're exceptionally wear-resistant—hardened to Rockwell C50 for longer wear-life under any conditions.

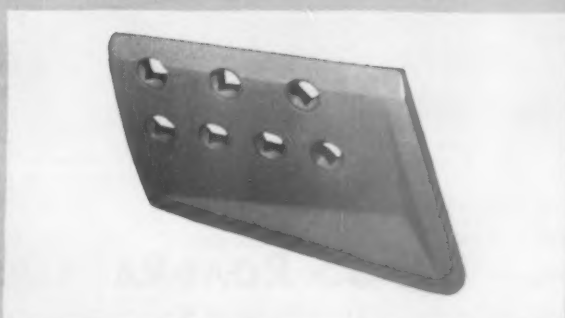
Check the price! Improved Cat Tips sell for about the same or even less than other leading brands.



They're available in two new designs. Both the short and long tips shown in the photograph are *self-sharpening* to keep their working edge until replacement. The long tip gives extra wear-life with only a slight reduction in impact strength. Low-cost, weld-on shank adapters are available for *all brands* of shanks. No need to wait—you can put these new Cat Tips on your job immediately.

In field tests the short tip was pitted against two leading brands on rippers working in caliche and cemented conglomerate beds. The Cat Tip outproduced the other brands 25-50%—representing savings of 38-54% in replacement costs.

Outstanding impact strength! One No. 9 Tip, tested in *solid granite*, took 13 smashing blows from another D9 pusher that backed up 10 feet before each charge at the stalled D9 Ripper.



And here's another money-saving newcomer—Cat's new No. 7, No. 8, No. 9 End Bits are redesigned for better digging ability. They self-sharpen as they wear away for continuing like-new performance. They're forged alloy steel and heat treated for outstanding strength and wear-resistance.

Compare other ground-engaging tool brands against the Caterpillar line. Keep machine-hour records and find out for yourself which is the best buy. Those who do, buy Caterpillar.

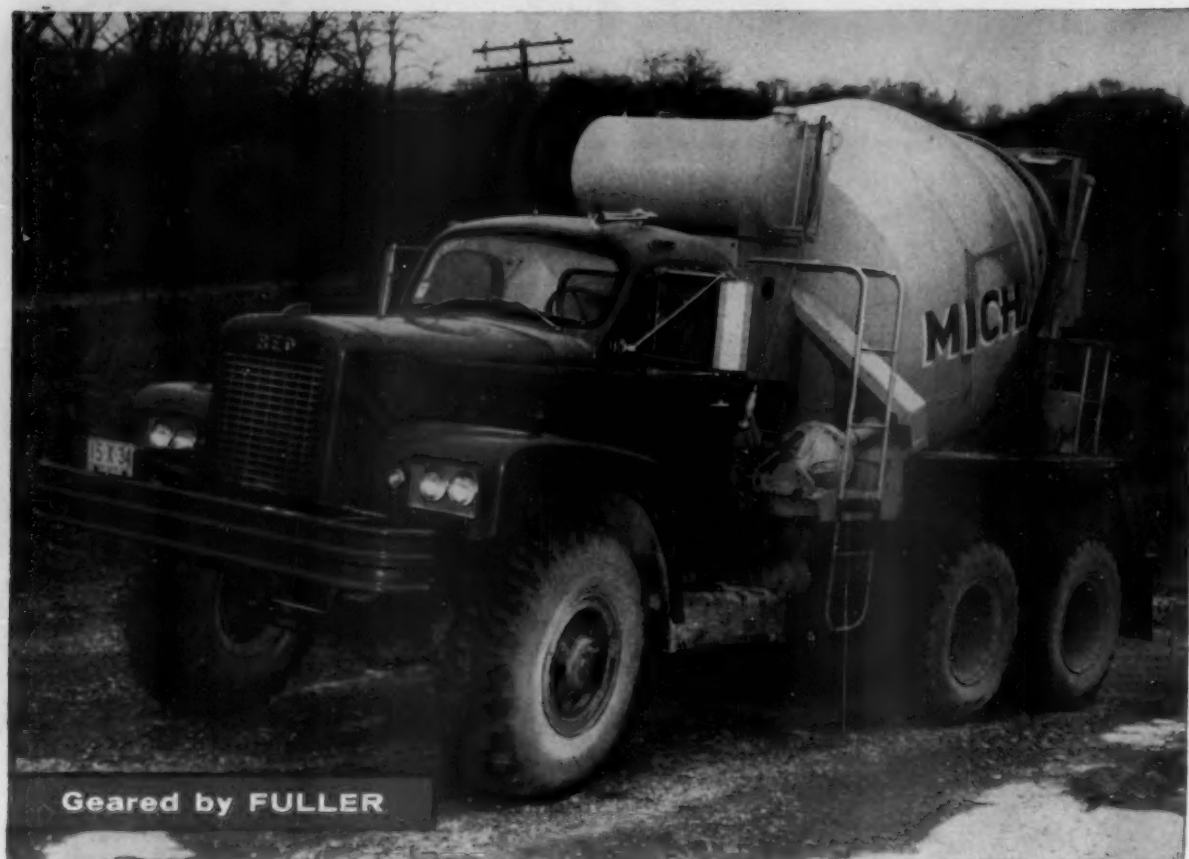
See your Caterpillar Dealer for the best in parts and service.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment



One of Michael's Fuller-equipped Reo F-505 6 x 6 OH Transit Trucks. The power is transmitted through a Fuller R-35 7-speed ROADRANGER to a 2.55:1/1.00:1 transfer case and 7.59:1 front and 7.54:1 rear axles.

R-35 ROADRANGERS from Pit to Patio

"We have more than doubled our business in the last three years," Vern Michael, owner of Michael Concrete Products, Inc., Loveland, Ohio, says. "Since we bought our first big Fuller-equipped Reo in 1957, our trucks always come through on deliveries. That Fuller R-35 ROADRANGER Transmission should be given a major portion of the credit for this performance. It has the get-up-and-go we need to get thru the rough construction sites where we operate."

Fuller R-35 RoadRanger features:

- No gear splitting — 7 selective and progressive gear ratios
- Easier, quicker shifts — closely spaced and equal ratios in the operating range
- One shift lever controls all 7 forward and 1 reverse speeds
- Engines work in peak hp range with greater fuel economy
- Compact transmission — only 375 lbs., 26-25/32 inches in length

RATIOS

Gear	Std.*	Opt.**	% Stop
Seventh	1.00	1.00	*33 24**
Sixth . .	1.33	1.24	
Fifth . .	1.79	1.67	34.8
Fourth . .	2.42	2.25	34.8
Third . .	3.30	3.06	36.5
Second . .	4.90	4.55	48.6
First . .	8.20	7.62	67.3
Reverse	7.63	7.09	

Weight . . . 375 lbs.
Oil Capacity . 16 pts.

FULLER TRANSMISSION DIVISION
EATON MANUFACTURING COMPANY 
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Industry News

continued from page 56

Concrete showcase home for American Cement Corp.

Decorative reinforced concrete—inside and out—forms the new Wilshire Boulevard home of American Cement Corp., Los Angeles, Calif. A 9-story columnless tower rests on four floors used for parking, and at the 4th-floor level, glassed-in executive offices are set in a landscaped terrace. At the 5th-floor level, reinforced "transition" box girders transmit exterior wall loads to the supporting pillar system, which extends down to the foundation. The unique building also contains the first-known use of sculptural diagonal "X" members in a load-bearing grille. The two-ton, story-tall members are most appropriate for earthquake-prone southern California.

Designed by Daniel, Mann, Johnson & Mendenhall, the American Cement building provides 122,000 sq. ft. of office space, 100,000 sq. ft. of parking, and 10,000 sq. ft. of lobby and commercial area. Constructed for a cost of \$3.5 million, the building—even though unconventional in design—is estimated to be about 10 percent less costly than the average office structure.

Dorr-Oliver undertakes Moroccan research

Dorr-Oliver, Inc., Stamford, Conn., has undertaken a research project for the Moroccan government agency L'Office Cherifien des Phosphates (OCP). OCP is concerned with expanding the country's important phosphate industry, and is seeking to discover the economic feasibility of a vapor recompression phosphate rock drying technique. Nuclear power may be used as a fuel source, as tremendous volumes of steam are needed, and Moroccan fuel costs are high.

Please turn to page 63

BELT INSTALLATION MEN LIKE TO WORK WITH...

FLEXCO® BELT FASTENERS



Lowell Lynde, Service Engr., Barber-Greene Co. completing the installation of a FLEXCO splice.



Cutaway of a FLEXCO application showing the compression plates, teeth and precision-made bolts and nuts.

He says, "I've spliced most of the belts our Chicago office has sold throughout Illinois and northern Indiana. FLEXCO fasteners have been used on all of them without any trouble. They are easy to install and hold up well regardless of the material conveyed."

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS

WITH FLEXCO . . . the quality fastener for all heavy-duty conveyor belt applications: COAL & METALS, SAND & GRAVEL, CRUSHED ROCK, CONSTRUCTION EQUIPMENT, etc.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

FLEXCO "25-PAK"



"25-PAK" contains enough fasteners to join common belt widths.

Flexible STEEL LACING COMPANY

4684 LEXINGTON STREET

CHICAGO 44, ILLINOIS

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ROCK PRODUCTS, September, 1961

How would you like \$2000 PROFIT

Sounds fantastic . . . but it's true! If you use equipment to *pull, push, dig, lift or load*, you can save up to \$2000, in just the time it takes to sign your name on an order for a new Case industrial tractor.

That means you make a handsome profit *before the equipment moves an inch.*

Certainly price alone isn't reason enough for you to buy *any* working tool for your business. But here, in Case machines, you also know you're getting premium quality, a fine record of performance, that insures you an extra return on your investment every day it works for you.

You'd be wise to go into details with your Case dealer *now.*



Here's the Case deal in a nutshell: a better price to start with . . . quality beyond question . . . performance that speeds up your

production. All good reasons for you to check into the outstanding buying opportunity you have right now.

It's "PROFIT PICKIN' TIME" NOW

to pick up

IN 7 SECONDS?

SAVINGS

UP TO

\$600

\$700

\$1000

\$1500

\$2000

3 BASIC TYPES AVAILABLE...

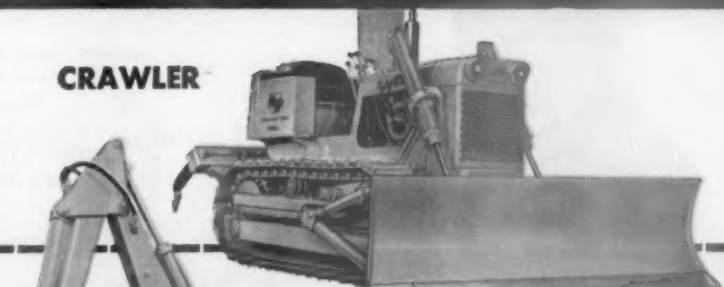
It's a fact that these savings are *especially* impressive when you consider the unusual advanced features that help give Case equipment its outstanding superiority. Here are a few:

- Case crawlers with exclusive Terramatic® Transmission speed up the pace of production, help insure a better margin of profit on close-bid jobs. And better performance holds for every job after that for years to come.
- Operator comfort, extra safety factors and the utter simplicity of control provide additional bonus benefits. Matchless work visibility too, adds to operator productivity.
- You can get proof before you invest a cent. Just ask for a Case demonstration test. See any piece of Case industrial equipment do a better job faster, right before your eyes.

ASK FOR A DEMONSTRATION NOW!

Your Case dealer needs only a call from you, an idea of the equipment you need. He'll set up a demonstration to prove every point we make. And then he'll quote you a deal no cost-conscious businessman could resist!

CRAWLER



WHEEL TRACTOR



WHEEL LOADER



Plus a multitude of combinations

at all **CASE** INDUSTRIAL DEALERS

“I would rather have a
TELSMITH 10 to 1”

Says

**LEO
FRANK**

of

Frank Bros.
Milton Junction
Wisconsin

**Aggregate
Producers**

P-25-761

♦ You never saw a man more fired up about a crushing plant. “I would recommend this TelSmith 367 Gyrasphere portable plant to anyone,” says Mr. Frank. In four years, and upwards of 400,000 tons of actual crushing, the TelSmith Gyrasphere required *no replacement of parts and not one cent for maintenance welding.*

♦ Mr. Frank had the unique experience of crushing with his TelSmith 367 along side another nationally known plant in the same pits. The TelSmith plant proved to be far superior to the combination jaw and roll crusher machine in both performance and economy. Cost per ton crushed was considerably less than that of the dual crusher type.

♦ His plant mechanic, Jim Murphy, said “TelSmith is *no maintenance problem*, while you can’t keep the other crusher operating without working on it regularly.”

♦ Compare these advantages and you’ll see why Mr. Frank prefers TelSmith 10 to 1: lower initial cost; maintenance costs cut to the bone; big ratio of reduction (6" down to ¾") for high capacity crushing. All this means one thing—*highly profitable performance.*

♦ Call your TelSmith distributor, or write direct for Bulletin 276. See for yourself why Frank Bros. are so high on TelSmith’s 367 Gyrasphere portable plant.

TelSmith 367 Portable closed circuit crushing-screening plant of Frank Bros., Milton Junction, Wis.



SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE, MILWAUKEE 1, WISCONSIN

DIVISION OF
Barber-Greene

Cable Address: Sengworks, Milwaukee • Representatives in Principal Cities in all Parts of the World
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Industry News

continued from page 59

General Graphite expands plant, mica recovery

A \$500,000 expansion which will triple its capacity to 600 tons per day is underway at General Graphite Co., Ashland, Ala. The company also is building a new mica recovery plant at its home site.

Our nation's missile and space program will be a principal customer for General Graphite's stepped-up production. The latter is providing graphite to National Carbon Co. for tests involving the material as a solid fuel propellant for space ships.

Houdaille hosts joint Pennsylvania sessions

July 12 to 14 were the dates of a joint meeting of the Pennsylvania Sand and Gravel Association and the Pennsylvania Ready Mixed Concrete Association. Over a hundred met at the Shawnee Inn to hear speakers such as Vincent P. Ahearn, managing director of the National Sand and Gravel and Ready Mixed Concrete Associations; Charles A. Nicholson, president, Pennsylvania Ready Mixed Concrete Association and Centre Concrete Co., State College; and Charles A. Smith, Jr., president, Pennsylvania Sand and Gravel Association and Oil City Sand & Gravel Co. Technical presentations were made by Herbert Cook, vice president-engineering, Master Builders Co., Cleveland, Ohio, and Felix Arkuszeshi, technical engineer, American Bitumals and Asphalt Co., Baltimore, Md.

Houdaille Construction Materials, Inc., was host to the meeting, and a tour of its Portland operations was a highlight. Members also toured the Keystone Portland Cement mill operation at Bath.

Please turn to page 64

Here is the SUPER-DUTY

Cape AnAlloy DROP BALL

for long- rugged service

FORGED and **HEAT TREATED**

from abrasive resisting **ALLOY**

STEEL. Specifically designed

for rugged service. Economical,

dependable secondary

breakage! **SONIC TESTED** before

shipment.

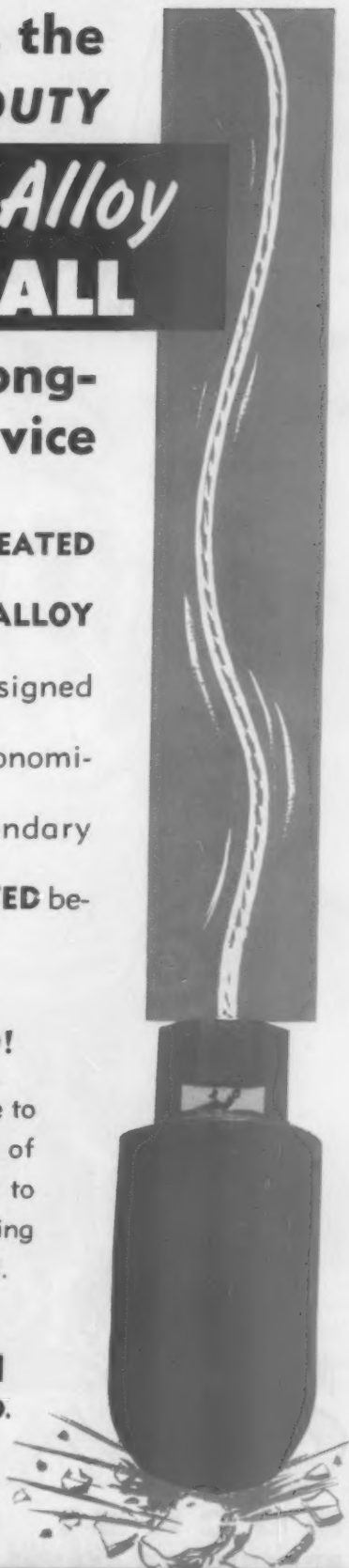
FULLY GUARANTEED!

"Cape Ann" will continue to offer its regular line of **FORGED** steel drop balls to those operators not requiring this Super Duty Drop Ball.

CAPE ANN
ANCHOR & FORGE CO.

P. O. Box 361

GLOUCESTER
MASS.



THE BIG BITE

● Hook an OWEN Clamshell Bucket to your crane and you're sure of superior performance and longer life. For OWEN Buckets have exclusive super-efficiency and long-lived features you won't find in ordinary clamshells.

For instance:

- Block and tackle type reeving
- One-piece head construction
- Recessed lips
- Single main shaft
- Riveted bowl assembly

For over half a century OWEN has been building clamshell buckets—tailored to meet the requirements of "men who move the earth the world over".

So team your crane to the bucket with the BIG BITE that's JUST RIGHT for every job!

Write today
for the money-saving
facts and figures.

THAT'S JUST RIGHT!

The  **OWEN**

BUCKET COMPANY

BREAKWATER AVENUE • CLEVELAND 2, OHIO

BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida

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Industry News

continued from page 63

Sand screening, settling booklets are available

Two booklets on sand preparation that were originally published as a service to ROCK PRODUCTS readers are still available and may be had by writing this magazine. Nathan C. Rockwood's "Screening Fine Materials," copyrighted in 1946, is an authoritative discussion of determining factors in the operating efficiency of vibrating screens.

Another volume, "Fundamental Principles of Sand Settling," (copyright 1929 and 1943) was written by the late Edmund Shaw as a practical guide to commercial sand producers. A limited number of these standard references still on hand will be given to those requesting them.

Universal Atlas takes over Florida distribution plant

Port Everglades, Fla., cement storage and handling facilities have been purchased by Universal Atlas Cement from Ponce Products, Inc., of Puerto Rico. The self-unloading bulk cement carrier S. S. Florida State will continue to transport cement from Ponce Cement Corp., which will manufacture cement on the island in accordance with Universal Atlas specifications to be sold under the "Atlas" brand.

Million-dollar storage plant goes up in Rome, N.Y.

Lake Ontario Portland Cement Co. will operate a \$1 million cement storage and distribution plant in Rome, N.Y. Run as a subsidiary, Mohawk Valley Co., Inc., it will receive cement by canal barge from the Picton, Ontario, plant and distribute it to the central, eastern and northern parts of the state.

Please turn to page 66

On a narrow ledge in the High Sierras, pinned between a 750-ft. sheer drop and a 500-ft. wall of solid granite, this 3 yard Trojan, Model 304, has handled over 173,000 yards of blasted material on the 6 mile Angeles-Crest cut-off while leased by the California State Highway Department . . .



. . . Under the most precarious working conditions, this machine has loaded an average of 130.8 cu. yds. per hour during 1,324 hours of operation with less than 2% downtime. Records of one 11 day work period showed the Trojan handling 1,691 loads—one every 2.8 minutes—for a total of 9,546 cu. yds. Trojan's cost per yard was

\$0.1122, as compared to \$0.5051 per yard for the entire operation . . . Trojan's extra wide tread and long wheel-base were among the many features contributing to the efficient, sure-footed performance on this difficult project . . . Your local distributor will gladly demonstrate these and the many other extra values built into every Trojan model.

AD. NO. 44-44



THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION • BATAVIA, NEW YORK

Need replacement V-Belts?



Reliability of Gates Hi-Power V-Belts makes them industry's No. 1 choice

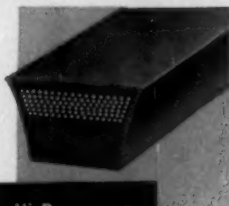
The exclusive construction features of Gates Hi-Power V-Belts—the Concave Sides (U.S. Patent No. 1813698), the Arched Top, the Flex-Bonded Tensile Member—make them more dependable than ordinary, conventional V-belts. They give you long belt life on even the toughest applications.

Moreover, because of Gates high standards of quality control, you get a perfectly matched set of Hi-Power V-Belts every time—every belt pulls its share of the load throughout the service life of the drive, further increasing belt life.

You will get fast delivery of Hi-Power V-Belts from the local stock of your nearby Gates Distributor. Call him today.

The Gates Rubber Company
Denver, Colorado

BP 60



Gates Hi-Power
V-Belts are quickly
available everywhere.



Building the
future on
50 years of
progress



Gates Hi-Power V-Belts

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Industry News

continued from page 64

PCA studies freezing effects on lightweight aggregate mix

A study has been made of the resistance of lightweight aggregate concrete to freezing and thawing in the presence of water and de-icing chemicals. After extensive research, it was discovered that the use of entrained air in a manner similar to its use in normal-weight aggregate concretes resulted in a satisfactory performance.

This work is detailed in Portland Cement Association Research Department Bulletin 121, "Freezing and Thawing Tests of Lightweight Aggregate Concrete," by Paul Klieger and J. A. Hanson.

Dewey's new Tulsa plant gets Little Rock outlet

Dewey Portland Cement Co. is erecting a \$125,000 truck loading terminal in North Little Rock, Ark., which will be supplied from its new Tulsa plant (see ROCK PRODUCTS, August 1961, p. 44). Predictions are that the proposed development of Arkansas River navigation will eventually improve transportation greatly within the Tulsa-Little Rock area. District manager and supervisor of the terminal's facilities is Michael Banks, who has been associated with the firm for three years.

State-owned cement plant buys rich limestone land

Limestone-bearing property holding an estimated 100 years of raw material reserves has been purchased by the South Dakota Cement Plant, Rapid City. Over \$500,000 was paid for the 195-acre tract, which adjoins the plant's present property. State geologists assess the amount of limestone at close to 28 million tons.

Solite demand opens another Hudson Valley plant

Thirty-three sites were investigated before Hudson Valley Lightweight Aggregates Corp. settled on Saugerties, N.Y., for its new Solite plant. This operation is the largest plant of its kind serving the New York area.

A lightweight aggregate produced from slate by a rotary kiln process, Solite produces lightweight structural concrete weighing one-third less than ordinary concrete. It is durable, fire resistant, and being chemically inert will not rust or stain. It is claimed to have excellent insulative qualities. Masonry units made with this aggregate are also gaining in popularity; they can be as much as 50 percent lighter than conventional units.

Hawaii gains a \$50,000 crushing plant

A \$50,000-rock crushing plant in Kalihiwai Valley, Kauai, has been added to the facilities of Grove Farm Co. Established to serve the northern end of the island, the plant will process rock for highway and general construction purposes.

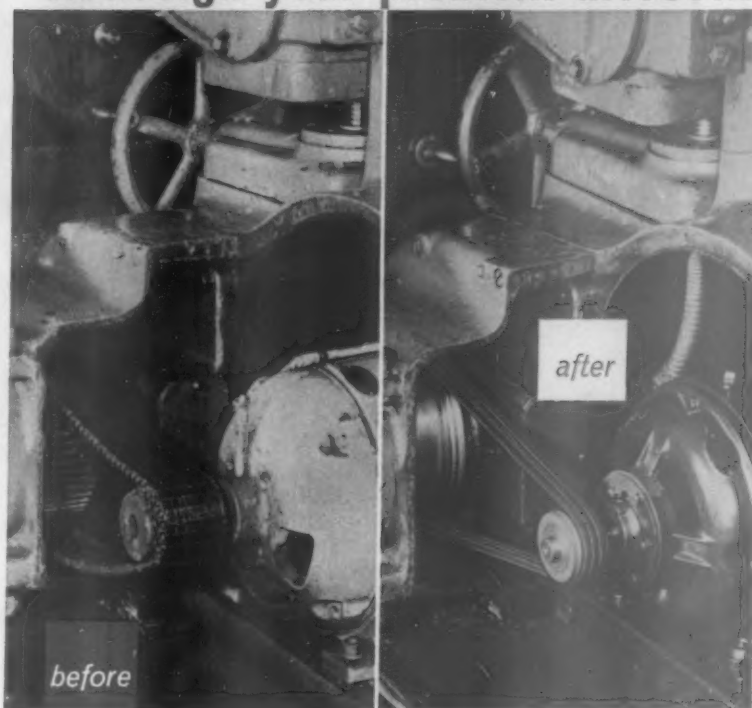
ARBA's pocket-sized directory out

The American Road Builders' Association has published its 1961 edition of the Highway Officials and Engineers Directory. This pocket-sized book lists over 2,000 officials in the 50 state highway departments, the Bureau of Public Roads, the toll road authorities, and the ARBA staff itself.

This annual directory is available at \$1 each from the Association, World Center Building, Washington 6, D.C.

Please turn to page 70

Redesign your problem drives...



How Gates Super HC Drives are reducing drive down-time

If you have a chain, gear, flat belt or conventional V-belt drive that is causing costly production down-time or high maintenance costs, a Gates Super HC High Capacity V-Belt Drive can be your answer.

Because of exclusive changes in V-belt shape, construction and materials, a Gates Super HC Drive can handle the same power as a conventional V-belt drive in $\frac{3}{4}$ to $\frac{1}{2}$ the space—with fewer belts and smaller, lighter-weight sheaves. As a result, bearing loads are less, giving increased bearing life. Also, it is often possible to eliminate outboard bearings and jack shafts, reducing the number of elements present to cause drive down-time.

Moreover, Gates Super HC Drives absorb machine-damaging vibration and shock. Multiple belts assure you of continuous operation, further cutting costly machine down-time.

The Gates Man near you is a drive design expert. Ask your nearby Gates Distributor for his help when you have a drive problem.

The Gates Rubber Company
Denver, Colorado

BP 61



Gates Super HC Drive saves space, weight and money

Exclusive design features include: precisely engineered Arched Top, Concave Sidewalls, Flex-Weave cover, super strength tensile construction.

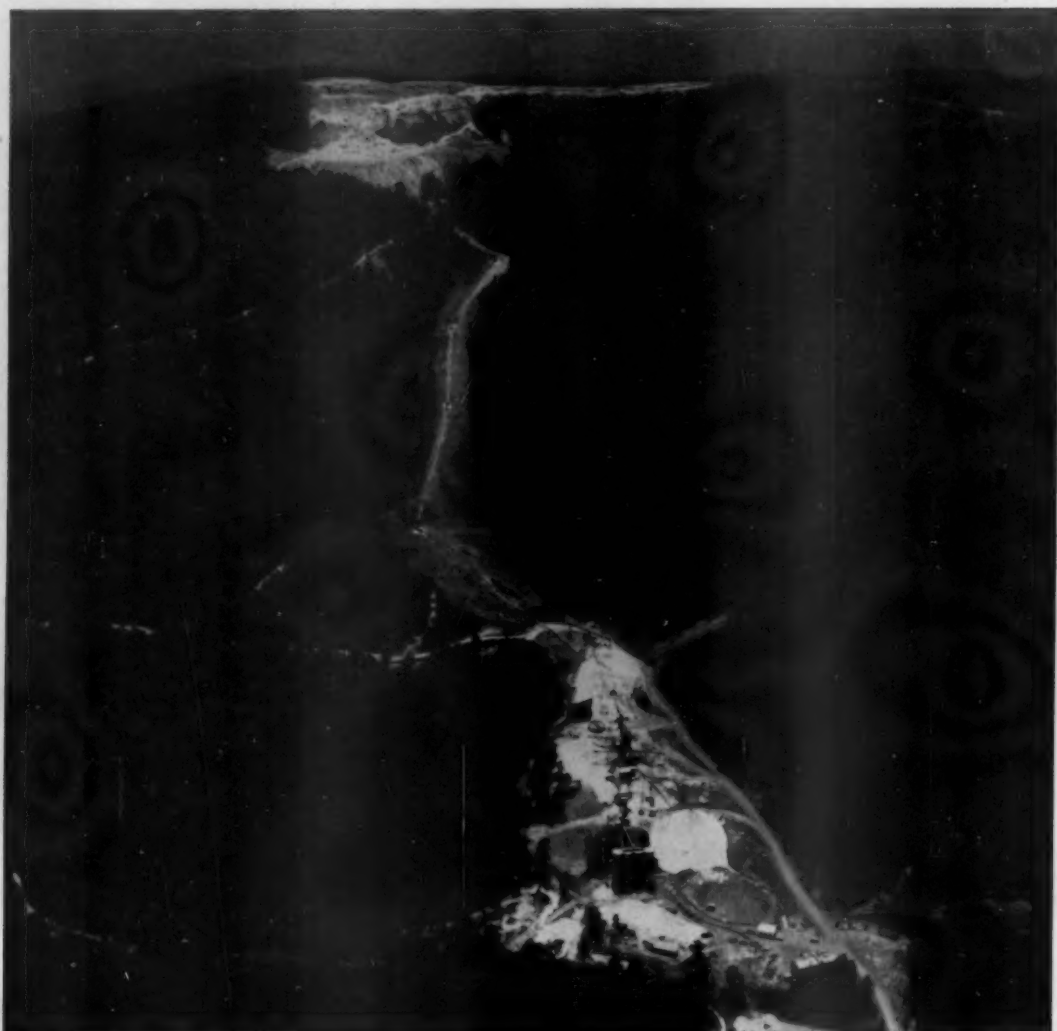


Gates

Building the future on 50 years of progress

Gates Super HC V-Belt Drives

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AERIAL VIEW, above shows overall operations from mountaintop quarry to the preparation plant site carved out of the mountainside. The zig-zag path of the five flights of Barber-Greene belt conveyors that deliver crushed silica from the peak to the plant is clearly visible from the air.

QUARRY CLOSEUP, lower left, shows how the quarrying is done at the very top of the mountain with the blasted silica dozed over the cliff to the level of the crushers. The primary surge pile is shown at the extreme left with the first down-slope conveyor starting at that point.



HOW REMOTE SILICA SAND RIDES CONVEYORS FROM MOUNTAINTOP TO MARKET

This huge mountain-straddling deposit of almost pure silica sand, thought to be out of reach of profitable processing until mid-1960, now rides Barber-Greene belt conveyors from mountaintop to market at 400 tph.

Operations at the Silica Corp., of America plant, Elkhorn City, Ky., follows this tri-level operational pattern:

MOUNTAINTOP — Silica is blasted loose in the quarry, dozed over a cliff face for additional breakup, crushed to minus 4" size, and conveyed to a primary surge pile at the peak. Quarry elevation is 700' above processing plant.

SIDE SLOPE — Five flights of 30" Barber-Greene belt conveyors totaling 2,710' in length do a spectacular material-moving job in transporting

400 tph of crushed silica from the surge pile at the quarry to the preparation plant. This plant, fed from a secondary surge pile at the site, removes impurities and stores clean sand in silos. Trucks are loaded from the silos for direct shipments to customers or for shuttling to the rail terminal.

MOUNTAIN BASE — Rail siding with silo storage and automatic loading equipment speeds carload silica shipments.

Your Barber-Greene Conveyor Representative can deliver an equally ingenious and profitable material-handling system to your specs when you open new operations or expand old ones. That's what makes the belt conveyors he sells the overwhelming No. 1 choice of pit and quarry operators.



Your belt conveyor equipment headquarters

Representatives in Principal Cities of the World

Barber-Greene

Main Office and Plant: AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT



LAST LAP, left, silica moves from fourth to last downslope conveyor onto 60' high secondary surge pile at plant. Unique use of transfer point stone ladders, shown in foreground, permits conveyors to follow mountain contour and substantially reduced total length of conveyors required. Conveyor drives apply braking force rather than drive force and generate approximately 250 hp.

PLANT VIEW, shows silica being reclaimed from secondary surge pile and directed into plant for cleaning. Downslope conveyors have four-way power shut-offs to set brakes, giving complete control flexibility should abnormal loading situations occur. Over-speed or underspeed of any belt automatically shuts off power to preceding conveyors in the system. Manual control also provided with master switches and local switches at each drive unit.



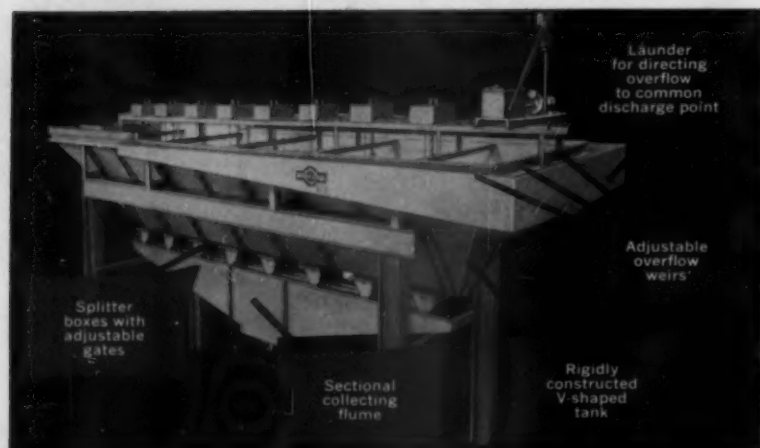
Most Effective Design

for classifying
and scalping
excess water
from fine materials



Single, double or triple collector flume construction—with a full range of sizes for various capacities. Ask for Bulletin SC-59.

SAND CLASSIFYING TANKS



McLANAHAN

Corporation

HOLLIDAYSBURG, PENNSYLVANIA

Pit., Mine and Quarry Equipment Headquarters Since 1835

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Industry News

continued from page 67

Articles of incorporation

Northern Counties Materials Co., Inc., Sutter County, Calif., has been incorporated with capitalization of \$75,000 to manufacture building aggregates.

Chehalis Sand & Gravel, Inc., Chehalis, Wash., is incorporated to produce and sell sand, gravel and similar products.

Premium Rock Products, Inc., Phoenix, Ariz., is incorporated to mine and manufacture mineral products. Elliot N. Yearsley is agent.

Roberts Lime, Inc., Denver, Col., has been incorporated by Donald M. Leshner, William B. Chasteen and R. Dale Tooley, with the object of mining, exploration, development and marketing of all type of minerals.

Berkshire Gravel sells plant

Berkshire Gravel Co., Pittsfield, Mass., has sold its plant and 225 acres of land at Lenox Dale to W. E. Williams, Inc. This sale will not influence the operations at company headquarters in Pittsfield, and Berkshire Gravel will also continue to operate its transit-mix plant at the Lenox Dale site.

Help your local post office

Rock products producers can make a definite improvement in the efficiency of their local post office by observing a few simple procedures: (1) Mail early in the day, rather than at the closing time rush; (2) Segregate local, air mail and out of town material in your own office; (3) Schedule large mailings to designate "priority" and first class mail of lesser importance so the post office can work on the most important material first.

**"Ghost" firm operations
materialize in Catskills**

The Ravena-Coeymans area in upstate New York has been alive with rumors that a foreign-financed company was going to erect a cement plant. The mystery was somewhat cleared up when the St. Lawrence Cement Co. of Canada called for excavation work bids for a production plant. The company, reputedly Swiss-backed, owns another U.S. cement producing subsidiary in Dundee, Mich.

**Mountain of sand provides
expressway foundation**

The Bergen Expressway link over the Teaneck-Leonia meadows got its sand foundation from a million-cu. yd. mountain 40 miles away. Five trains, averaging 40 cars, shuttled the sand from quarry to meadows. There a huge hopper, capable of handling 8 to 10 railroad cars of 60-ton capacity at one time, mixed it with water and pumped it out in "columns" which spread a blanket of sand over the ground.

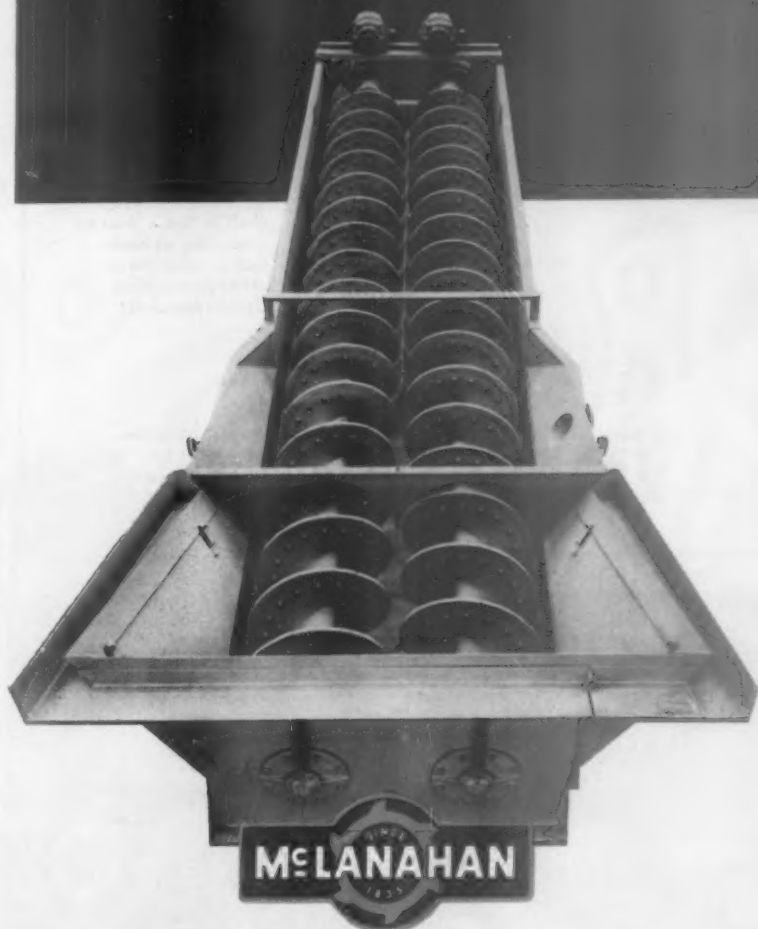
**New plant, terminal for
Missouri firm**

The Missouri Portland Cement Co., St. Louis, is beginning work on two important projects this summer. At Joppa, Ill., a plant with annual capacity of 3 million bbl. is underway, predicted to start production in the summer of 1963.

Omaha, Neb., is the site of the company's new cement storage and shipping terminal. Scheduled for completion later this year, the terminal is located on the Missouri River, so that cement can be brought up by barge from Missouri Portland Cement's Kansas City plant.

Please turn to page 72

all the features that mean
HIGH-PROFIT TONNAGES
for you



Screw Washers

• *Superior System for Controlling Fines*—low turbulence, extra-large flared settling area, adjustable overflow weirs • *Rigidly Constructed Box* • *Improved Drive*—fully enclosed, with all gears running in sealed oil bath, simplified direct-shaft reduction • *Durable Screws*—renewable hard-iron, spiral steel flights with segmented wearing shoes on extra-heavy pipe shaft.

Ask for Bulletin SW-80.

McLANAHAN
Corporation

HOLLIDAYSBURG, PENNSYLVANIA

PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1855

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HAYWARD CLAMSHELL BUCKETS

**WORK LONGER,
WORK FASTER,
WEAR LESS!**



Designed with rugged, one-piece alloy shells ... wide type, cast manganese steel cutting edges ... smooth shell interior for fast, capacity loads and easy discharge ... manganese bushings ... diagonal truss brace to keep shell in line ... has no side sway or back lash ... plus many other cost-cutting design features!

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Builders of Better Buckets Since 1888

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...without help, using a **POWER-CURVE Loader**

Bag loading costs of eight cents a ton are not uncommon in plants using Power-Curve equipment. One man loads and stacks direct from the packer with no need to lift a single bag. Loads can be palletized or stacked in any pattern, also put into warehouse storage.

There are Power-Curve installations near you. Let us show you how your plant can benefit from a custom engineered Power-Curve loading operation.

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Literature and engineering details sent on request.

POWER-CURVE
CONVEYOR COMPANY
2185 SOUTH JASON ST., DENVER 22, COLORADO

Industry News

continued from page 71

Solite encourages budding architects with award

In order to turn up creative uses for Solite lightweight aggregate, the Solite Corp., Richmond Va., annually sponsors an architectural contest at the University of Virginia.

This year the contestants designed a theater for the university. The three top prizes, awarded at the Spring Meeting of the Virginia Chapter of the American Institute of Architects, went to: Robert F. Bower, Falls Church; R. Caswell Cooke, Jr., Richmond; and Byron R. Dickson, Jr., Roanoke—all of them are fourth-year architectural students.

New cement plant for Houston

A multimillion dollar cement plant is being erected in Houston, Texas, for the McDonough Co., Parkersburg, W. Va. E. B. Good, vice president of the firm and president of Houston Shell & Concrete Co., estimated that production could begin during the latter part of 1962, and that the plant would employ approximately 100. Annual capacity of the plant will be 1.5 million bbl.

Love Field runway to be lime stabilized

A project described as a "big prestige job for lime" is the new 8,800-ft. runway being added to Dallas, Texas' Love Field. This will mark the greatest commercial use to date of lime stabilization for this type of construction.

The NW-SE runway will consist of 13-in. reinforced concrete pavement, with cement stabilized subbase and lime-treated subgrade. Designs, provided by Forrest and Cotton, Inc., architects, call for FAA-approved narrow-gauge and pancake lighting.

END

ALEMITE ACCUMATIC CENTRALIZED LUBRICATION SYSTEM RESULTS IN \$45,000 SAVINGS ON DUST COLLECTORS!

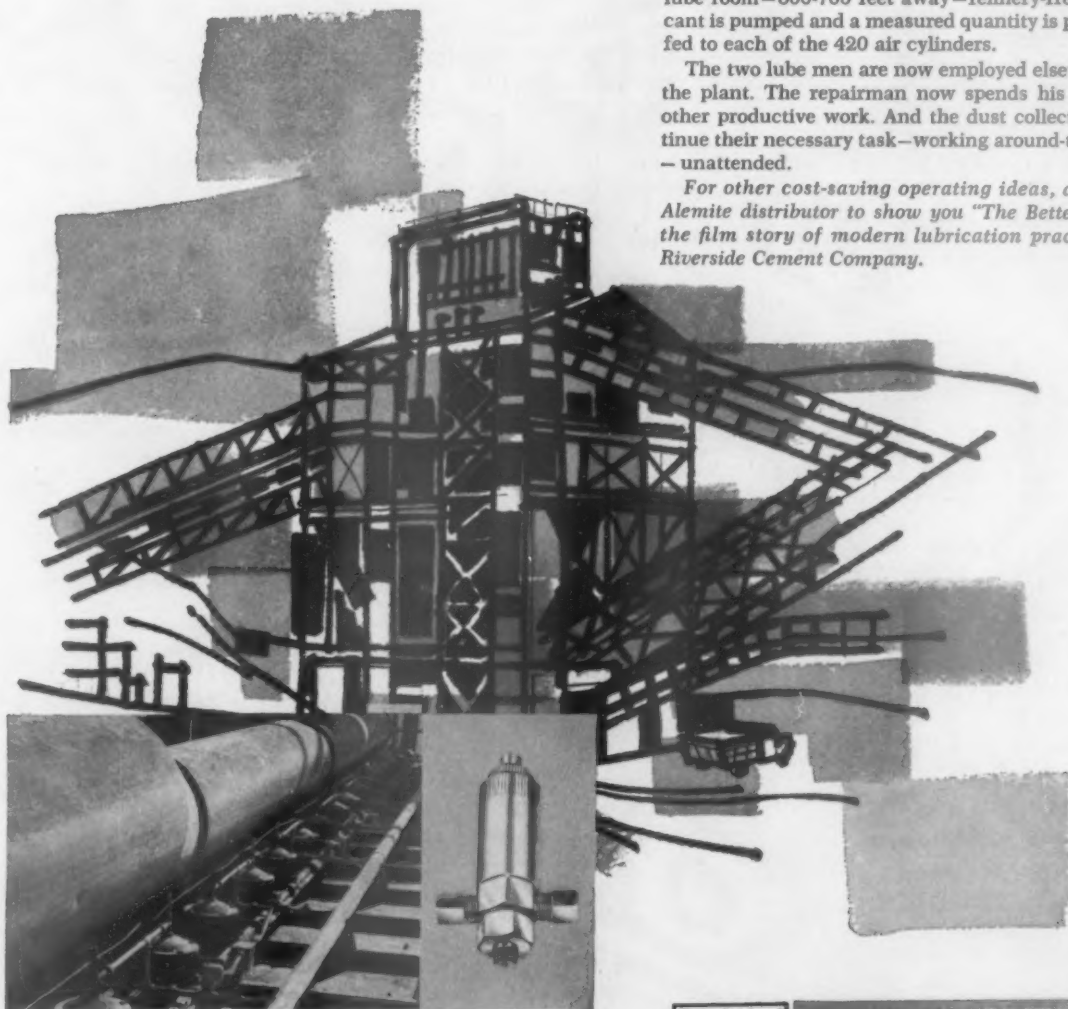
*Around-the-clock protection
and reduced operating costs
key to Riverside Cement Com-
pany's modernization program.*

Two lubrication men, a machine repairman and 50 extra air cylinders were needed to keep the Riverside Cement Company's dust collection system in operating condition. The lube men were kept busy hand lubricating the 420 air cylinder damper valves in the system. The repairman spent his time changing, replacing and rebuilding these cylinders.

Four years ago, Alemite, working closely with Riverside engineers, installed an Accumatic Centralized system on these cylinders. Now, from one central lube room—600-700 feet away—refinery-fresh lubricant is pumped and a measured quantity is positively fed to each of the 420 air cylinders.

The two lube men are now employed elsewhere in the plant. The repairman now spends his time on other productive work. And the dust collectors continue their necessary task—working around-the-clock—unattended.

For other cost-saving operating ideas, ask your Alemite distributor to show you "The Better Way," the film story of modern lubrication practices at Riverside Cement Company.



These 18 damper valves operating dust collector shaker mechanisms atop the secondary crusher building—plus 402 more throughout the entire mill—are lubricated by an Accumatic Type I system.

In Canada: Stewart-Warner Corporation of Canada, Ltd., Belleville, Ontario



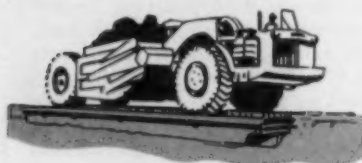
ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

Dept. T-51, 1850 Diversey Parkway, Chicago 14, Illinois
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Cut Maintenance Costs in the CONSTRUCTION INDUSTRY

with **MURPHY
Cardinal**

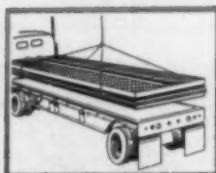
**all-steel
INDUSTRIAL
SCALES!**



PORTABLE—HEAVY-DUTY MOTOR TRUCK SCALES

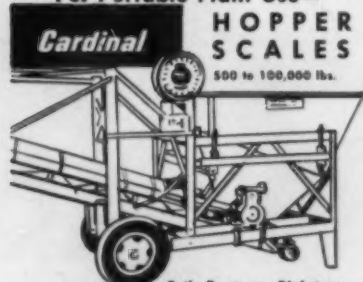
The high tensile strength of steel, and modern design simplicity—built from the ground up give lower installation costs and maintenance free operation.

- ★ TANDEM CONNECTED UNITS
- ★ SPLIT FRAME UNITS
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CALENDAR

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1961

September 17-20, 1961—Society of Mining Engineers, Minerals Beneficiation Division, meeting commemorating the 50th Anniversary of Froth Flotation in the U. S., Denver

October 2-3, 1961—Canadian Institute of Mining & Metallurgy and the Society of Mining Engineers of the American Institute of Mining, Metallurgical & Petroleum Engineers, Joint Meeting of Industrial Minerals Divisions, Ottawa, Ontario, Canada

October 4-5, 1961—National Slag Association, Annual Meeting, Pocono Manor Inn, Pocono Manor, Pa.

October 5-6, 1961—National Lime Association, Operating Meeting, Shoreham Hotel, Washington, D.C.

October 13-15, 1961—California Association of Engineering Geologists, 4th Annual Meeting, Hotel Senator, Sacramento, Calif.

October 16-21, 1961—National Safety Council, Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

1962

January 15-19, 1962—National Limestone Institute, Inc., Meetings, Roney Plaza Hotel, Miami Beach, Fla.

February 4-8, 1962—American Society for Testing Materials, Committee Week, Statler-Hilton Hotel, Dallas, Texas

February 5-9, 1962—National Sand and Gravel Association—National Ready Mixed Concrete Association, 32nd Annual Convention and Biennial Show, Conrad Hilton Hotel, Chicago, Ill.

February 11-15, 1962—National Crushed Stone Association, Annual Meeting & Exhibition, Conrad Hilton Hotel, Chicago, Ill.

February 18-22, 1962—American Institute of Mining Engineers, 91st Annual Meeting, Statler Hotel, N.Y.C.

April 3-5, 1962—American Institute of Electrical Engineers, Cement Industry Technical Conference, Chase Hotel, St. Louis, Mo.

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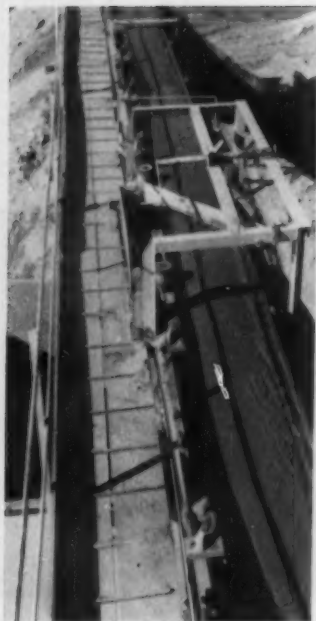
NAME _____ TITLE _____

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HINTS & HELPS

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Belt plow

A west-coast sand and gravel producer has borrowed a page from a foundryman's book with a home-made belt plow. Since it was necessary to fill a truck loading bin only once a day or so, it was scarcely worth the expense of breaking a long belt conveyor to install a new drive, new tail pulley and a chute with a flop gate.

The single plow has a rubber strip bolted to a steel blade so that only the rubber is in contact with the surface of the moving conveyor belt. When it is necessary to remove some of the sand, the blade is lowered manually. Its own weight provides enough pressure to depress the troughed belt and scrape off the sand. This is possible since the plow is

mounted between troughing idlers, and a straight face idler under the belt backs it up when the plow is in position.

Big classifiers nested together

When a western sand plant operator wanted to install four big 48-in. spiral classifiers he was stymied by the flaring tubs that prevented a compact installation in a straight line. The problem was resolved by removing the flared section from one side of each classifier, the right side of one and the left hand of

the other. The units can now be nested together in pairs so that all four units can discharge to a common belt conveyor. Apparently, there has been no noticeable loss in capacity or efficiency because of the amputated tanks.

Since all four classifiers are now directly beneath a sand scalping tank, the sand slurry produced a great deal of turbulence as it hit the classifiers. A section of used screen cloth with about $\frac{3}{8}$ -in. square clear openings was all that was needed to break the force of the torrent of water coming down feed pipes.

Newly designed curved-nose rock bucket improves loading speed

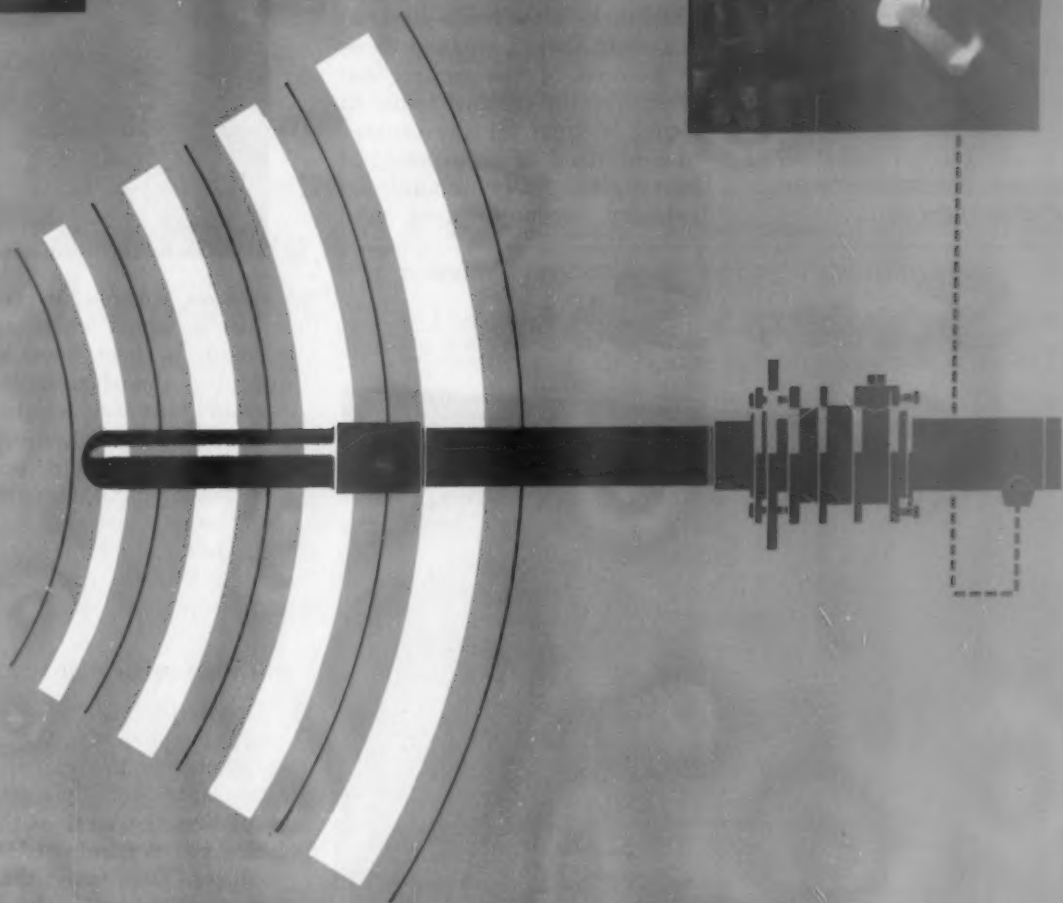


With a newly designed curved-nose bucket, an underground crushed stone producer is able to improve loading speed. Now he is able to get a full bucket while moving his loader into the pile of blasted rock at low speed.

The 3-cu. yd. bucket has a leading edge that projects some 8 in. beyond the edge at the cor-

ners. This apparently concentrates the force of the slowly moving machine to penetrate the toe of the pile and to fill the bucket more rapidly without spinning the wheels of the tractor shovel. Steel scuff plates line the bottom of the inside of the bucket to reduce abrasive wear.

Please turn to page 78



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ROCK PRODUCTS, September, 1961

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77

Hints & Helps

continued from page 76

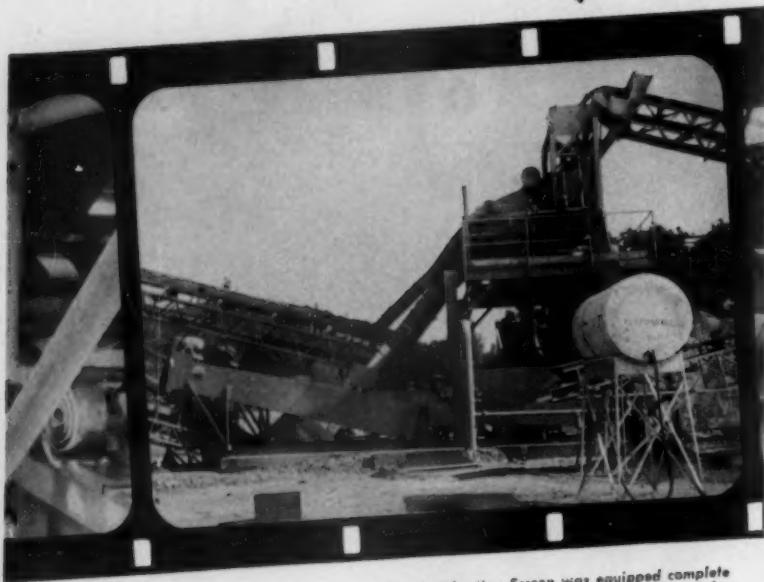
Bin-level indicators

Bin-level indicators can have great value to the operator who is willing and able to experiment with them. Of course, these devices are ideal for indicating the level of material in deep bins and to control the operation of machinery that puts materials in or takes them out.

A number of cement plants use high-level controls to signal when there is too much material in a chute above a crusher. Proper location of the control can often stop the crusher feeder in plenty of time for the crusher to clear itself of an overload of heavy rock. Safety-minded aggregates producers have used



Screen Story...



This Overstrom 5' x 10' Triple-Deck Vibrating Screen was equipped complete with water spray piping, supporting structure, and chutes and hoppers for Chris Henningsen & Son, Inc., Placerville, California. The modern new plant, designed and erected by Aggregate Engineers, Inc., of San Francisco, produces up to 200 TPH of specification sand, gravel, and crushed rock.

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high-level controls in transfer chutes to signal when material builds up in them. Some kind of control is almost essential in a skewed transfer chute that handles wet or sticky limestone.

A western cement producer finds that level controls are probably the cheapest kind of safety insurance for equipment, using them in transfer chutes, hoppers and screw conveyors.

Hardface roller chain sprockets

One of the big advantages of specifying steel plate roller chain sprockets for use in rock products plants is the possibility of rebuilding the teeth with hardfacing rod. A number of western producers have found that their big sprockets and small pinions can be reworked economically, thus lessening spare parts.

First step is to make an exact template from the contour of a new sprocket and then make sure that only this template is used when the tooth profile is restored. When the tooth is worn about $\frac{1}{4}$ in. at the pitch line, this seems to be the best time to build it up.

Apparently, the built-up area will last much longer than the original tooth, but it must be carefully checked with the template as it is built up. For best service from all parts, new roller chain should never be used with reworked sprockets nor an old chain with brand-new sprockets.

END

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More Capacity: With a 1¼ cubic yard bucket, this new model has 25% more capacity. At the same time, the exceptional stability and balance of the original H-30 unit has been retained.

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Less Maintenance: The only loader in its class with simplified boom mechanism and single bucket tilt cylinder having from 6 to 12 fewer pivot and grease points to service. All bucket and lower boom-arm pivot points are sealed against dust and dirt. The battery, instrument connections, fuel tank and transmission can be serviced from ground level. A stock of only 4 different hoses will service all the hydraulic system.

More Power: The H-30B has more horsepower-per-pound of weight than comparable tractor-shovels. Torque-converter is engineered to proportion engine power properly between drive-train and hydraulic requirements.

Better Braking: The four wheel hydraulic brakes give equal braking in forward or reverse and are sealed against dust and dirt. Exclusive HOUGH axle

design permits servicing and relining brakes without removing and exposing planetary hubs to dust.

Full Power-shift Transmission: The only loader in this class with a "full" power-shift transmission which does not require stopping and engaging gears for a "range" shift. There are three speeds, both forward and reverse, and all shifts in either direction can be made "on-the-go." This dependable HOUGH transmission has been proven in thousands of PAYLOADER units.

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Positive Oil Cooling: Separate fan-cooled oil-to-air radiator assures positive cooling of both transmission and torque converter oil even in hot climates. Another exclusive HOUGH protective feature.

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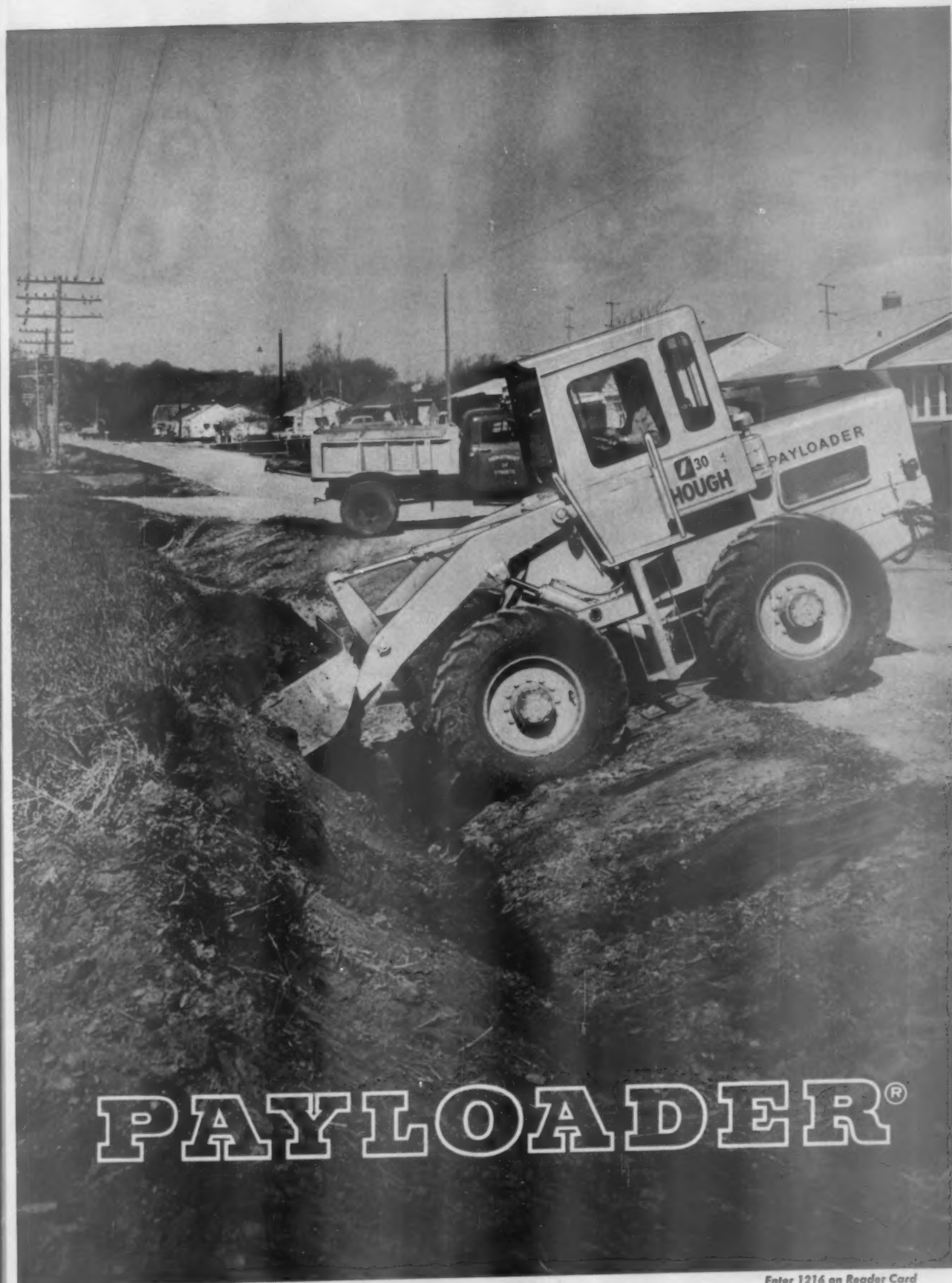
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PAYLOADER®

September 1961

HMS MEETS SPACE-AGE CHALLENGE

by John H. Bergstrom

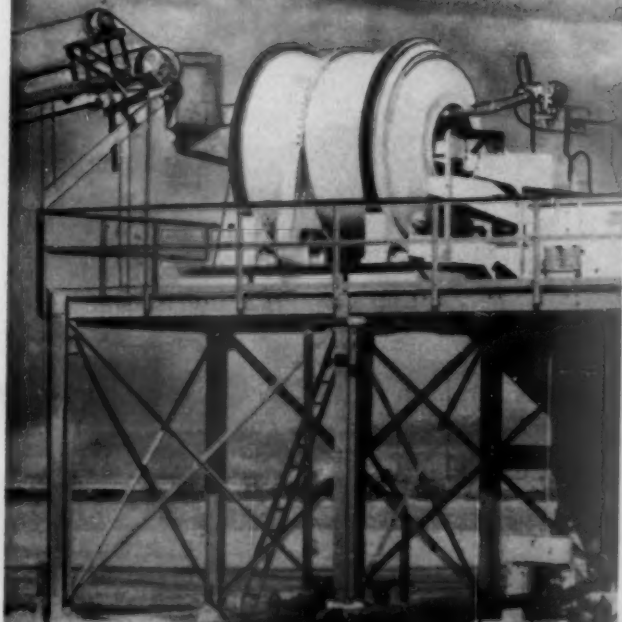
SPACE AGE MISSILES and other defense construction involving housing, schools, highways and research is a lucrative market—for the aggregates producer equipped to meet tight specifications. The Air Force's principal western missile facility at Vandenberg Air Force Base is an example. Coast Rock Products found the going pretty tough to supply the base's aggregates without a reliable beneficiation system.

The riverbed material at Santa Maria, Calif., worked by the 200-tph. plant contains 10 to 12 percent deleterious material—mostly shales and soft sandstone. All of the deleterious material is lighter than the sound gravel, although the specific gravity of the sandstone is very close to that of the acceptable material. Gravity separation seemed to be the logical answer, but the system had to be one that would make a clean, accurate cut—retaining the sound gravel as it eliminated sandstone and shales.

Several systems were carefully evaluated and analyzed. The company's final choice was a heavy media separation system. Even though both initial costs and day-to-day operating costs would be higher for HMS than any of the other methods

Please turn page

Right: The compact heavy media system processes 100 tph. of 1½ x ¾-in. gravel that has been carefully rewash-





HMS meets space-age challenge . . .

continued from page 83

considered, Coast Rock engineers felt that the reliability of HMS and its demonstrated ability to make a precise separation outweighed all its economic disadvantages. Actually, the economic cards weren't completely stacked against HMS. The cleaner separation possible apparently retained a great deal of premium material that is lost with many other methods. This just about evens the score.

The problem of shale and soft sandstone in the pit-run material is not a new one to producers in the area (see *ROCK PRODUCTS*, June 1961, p. 96). Coast Rock has faced the problem since starting operations here in 1956. Early methods of eliminating the deleterious material included the use of an impact breaker to break down the sandstone and a coarse material washer equipped with a shale remover. "We got by with these for awhile," says Jake Will, the firm's president, "but as specs kept getting tighter, we knew we'd have to come up with a more foolproof system." Heavy media separation got the nod.

Before a final decision was made, a series of laboratory tests were run at specific gravities in the range between 2.40 to 2.63. These tests revealed that HMS-processed material would easily meet all specs and that a specific gravity of $2.50 \pm .01$ would prove the best point at which to make the separation. This is the point at which sink material will meet all specs with negligible loss of sound rock.

Operating at a specific gravity of 2.50, the HMS plant is currently treating about 100 tph. of $1\frac{1}{2} \times \frac{1}{4}$ -in. gravel. This is well below its rated capacity of 150 tph. and allows plenty of latitude for future growth. Approximately 90 percent of the throughout is sink, which easily meets all state and federal specifications.

Plant feed is never split. Every bit of gravel is treated by the HMS unit or the HMS plant is shut down. When this happens, all material is processed for non-specification uses. This has proved the cheapest and most efficient method of operating the HMS plant.

Now let's examine how the heavy media setup fits into the processing system. Gravel that has already been washed once before being conveyed to the HMS plant, is re-washed on a 4 x 14-ft. double-deck screen. Top deck of this screen uses $\frac{7}{8}$ -screen cloth, while the bottom deck is provided with $\frac{1}{8}$ -in. cloth. This splits the $\frac{1}{4} \times 1\frac{1}{2}$ -in. feed into two equal portions to guarantee the most efficient washing action.

This pre-wash before HMS treatment is an es-

sential part of the system as it reduces media loss. Apparently, the media clings so tenaciously to dry or poorly washed gravel that it is exceedingly difficult to remove. Porous particles absorb media and carry it to waste unless this deleterious material is thoroughly soaked first. The medium used is a mixture of just about equal parts of magnesite and ferrosilicon costing around \$90 a ton. Obviously, it is worth some effort to conserve this material.

During the first month of operation, Coast Rock reported virtually no loss of this medium even though more than 1,000 tons of gravel were processed. Most plants with similar operations report media losses of $\frac{1}{2}$ lb. per ton of rock processed. The expectation that losses may remain below average can be attributed to two factors: (1) the plant is operating well below its rated capacity (100-tph. production vs. 150- tph. design) allowing more efficient media recovery and (2) the pre-wash screen that conditions the gravel.

HMS feed is conveyed directly from the pre-wash screen to the 8 x 8-ft. drum separator that is the heart of the circuit. The sound, heavy material sinks and is recovered by lifters inside the slowly rotating drum and discharges to the sink launder. The float material simply streams out the open end of the drum and discharges to the launder for this fraction. Both launders discharge onto a 4 x 16-ft. divided single-deck horizontal screen that is divided lengthwise. Here, media drainage and rinsing takes place.

The first 4 ft. of this screen are not equipped with spray bars to allow undiluted media to drain directly into a media sump. From here, it is pumped back to the drum separator. Spray bars along the rest of the screen thoroughly rinse the remaining media from the processed rock.

Rinse water is collected in its own sump from which it is pumped to a drum-type magnetic separator for reclaiming the magnetic particles. These then flow to a densifier serving two functions: (1) as a dewatering device and (2) as a storage tank. Media reclaimed from the densifier is passed through de-magnetizing coils and returned to the media sump. Weir overflow from the densifier goes back to the rinse water sump and is recycled.

Operation of the HMS circuit requires only one man. After start-up, taking only 15 to 20 min., his principal job is to maintain media at the proper specific gravity. Every 30 min. he checks a media sample on a direct reading scale and makes adjustments.

Sink and float are both conveyed to three 50-ton

steel bunkers on parallel belt conveyors. A 3 x 12-ft. double-deck wash screen mounted over the sink bunkers rinses the accepted gravel again to eliminate all traces of media, making two aggregate sizes in the process—1½ x ¾-inch and ¾ x ¼-inch.

The effectiveness of the HMS system is obvious even to the naked eye. The sink material is uniformly dark in color with scarcely any stray pieces of light-colored material. The float, made up almost entirely of shale and sandstone, is almost white in color. The relatively soft, porous rock in the float fraction is definitely not a waste material. It is in great demand for walkways, driveways, sub-slab drainage and other non-engineering uses.

Coast Rock Products also produces three sizes of normal, untreated gravel in addition to the three heavy-media products, two sizes of road base and two sands. The company's concrete and mason sand both meet all local specifications without beneficiation.

It is still too early to pinpoint definite operating costs with only a few months' operating experience. However, Coast Rock's early experience, combined with some careful estimates, indicates a direct operating cost of about 11¢ per ton. This represents 3½¢ for labor, 3½¢ for medium, 1½¢ for power, and 2½¢ for maintenance.

The HMS unit chosen by Coast Rock is a "packaged" unit that is both pre-engineered and prefabricated. It is a complete unit and required only the installation of a feed conveyor to integrate it with existing facilities. Prefabrication of the unit, including all supporting steel, resulted in rapid inexpensive erection. The existing plant facilities operated normally during erection.

An installation of a HMS system has often been the start of a long up-hill fight to gain acceptance for the treated material as a premium aggregate. Fortunately, Coast Rock has not had to fight this battle. Three other 60-tph. HMS plants are already in operation in the same part of southern California so that any pioneering in the use of beneficiated aggregates is a thing of the past.

With billions of dollars recently appropriated for further space research, much of it will probably be spent to expand facilities at Vandenberg Air Force Base. With this market added to an accelerated California highway program, Coast Rock Products seems assured of a good return on its investment in HMS.

But this isn't the end of Coast Rock's quest for new markets. Current plans call for the addition of another crusher, sand classifying, drying, stack-



Heart of the system is above ground level with the magnetic separator, left, and medium densifier screw, center

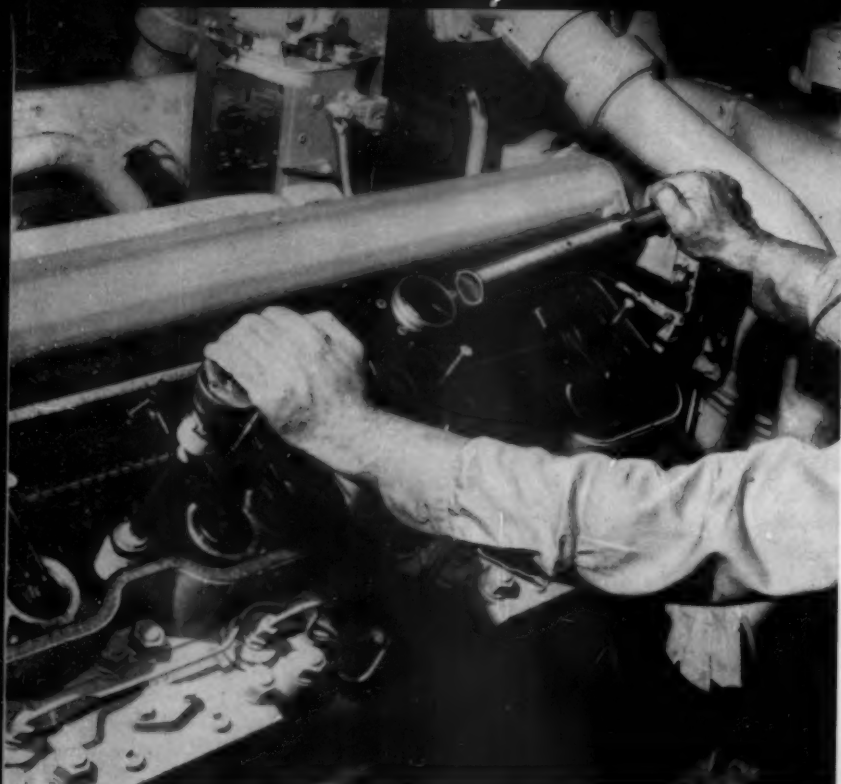


Specific gravity of the medium is checked regularly to maintain sg. at 2.50 plus or minus .01

ing conveyors and a hot mix plant. The expanded crushing facilities will up plant capacity to 300 tph., all earmarked to make hot mix aggregate for bituminous concrete. END

MAJOR EQUIPMENT REFERENCE

Haulage trucks, 30-ton	Cook Bros. Equipment Co.
Cranes, dragline	Northwest Engr. Co.
Loaders	Pettibone Wood Mfg. Co.
Vibrating screen, 4 x 14-ft. 3-d.	Simplicity Engr. Co.
Vibrating screen, 4 x 10-ft. 3-d.	Overstrom & Sons Inc.
4 x 12-ft. dd.	
3 x 12-ft. dd.	
Belt conveyors	Chain Belt Co.
Belt conveyors	Hewitt-Robins Inc.
Cone crusher	Nordberg Mfg. Co.
Jaw crusher	Universal Engr. Div.
Coarse material washers	Eagle Iron Wks.
Sand wheel	Stephens-Adamson Mfg. Co.
Heavy media system	WEMCO Div., Western Machinery Co.



Left: Good training of personnel and use of proper tools are "musts" in any maintenance program



Enthusiasm for a maintenance program should be generated at top-management level, and should reach all the way down the line to individual maintenance workers

Lubrication practices are sometimes the keystone to a good maintenance program. They must be planned and charted, carried out on schedule and properly recorded



Aggregates producers are turning to improved maintenance programs that reduce production costs. Small plants need better programs

You can jump profits with good maintenance

by George C. Lindsay

PREVENTIVE MAINTENANCE is catching on in the aggregates industry in a big way. The average company is giving today, more than ever before, more time, attention and effort to that important phase of operation. Yet, there's still much to do, to effect good programs that can save operators money—big money.

Three big factors stand out among those that are needed to continue betterment in industry maintenance practices. They are improvement in (1) attitude of management toward maintenance, and "selling" it down the line to the employee; (2) cost analysis and record keeping, and (3) training of supervisory personnel and maintenance personnel.

Suppose the aggregates industry could effect a 10-percent reduction in current maintenance costs—which can be done by paying closer attention to the above three factors. The estimated result would be nearly \$40,000,000 more in industry's profit pocket every year. That amount would mean a saving of nearly \$10,000 annually for the average size plant covered in a recent ROCK PRODUCTS survey. In the case of many plants, that sum is the difference between profit and loss.

A survey of the aggregates industry, referred to above, is the basis for this analysis. It covered 125 operating plants in the sand and gravel, crushed stone, lightweight aggregates and slag industries. Size of plants covered ranged from one with a very small annual tonnage, to a big 4,000,000-ton-per-year plant; average output per plant was 366,500 tons per year.

Total amount spent on maintenance by the plants covered was nearly \$10,000,000 a year; the

average was \$96,600 per plant. Expenditures included those for labor, parts and supplies.

Facts from the survey show that equipment in 9 out of 10 plants covered is regularly inspected, and is tested on a regular basis. Judging from results of past surveys, it would appear that respondents to this one represented the better-than-average operation.

Nearly 4 out of 5 plants surveyed have an established preventive-maintenance program. Three-fifths of the plants kept records of maintenance costs for each piece of major equipment in use. Moreover, about the same percentage indicated that the installed maintenance program had allowed them to reduce costs of maintenance an average of 26 percent below costs that existed before the program was begun.

We are indebted to the many who cooperated with us in this important survey, and take this means to thank them. It is only through their good assistance that we are able to present this type of study—one that we hope will be of help to the industry and to the individual units in it.

Management's attitude toward maintenance is an intangible that has a big effect on every company's maintenance practices and costs. Experts on the subject agree that proper attitude—in fact, enthusiasm—at the top is a primary requisite for success in any maintenance program. Some suggest that modern management must re-orient its thinking to coincide more with this age of big machines and mechanization, since every operating decision they make and every policy they establish does affect maintenance. *Please turn page*

You can jump profits . . .

continued from page 87

Table I—Average maintenance cost per ton for equipment used in the aggregates industry, by type

Type of Equipment	Cost Per Ton
Drills	\$0.0083
Shovels	0.0312
Front-end loaders	0.0327
Trucks	0.0444
Conveyors	0.0141
Crushers	0.0329
Dozers	0.0234
Screens	0.0296
Pumps	0.0117
Electrical equipment	0.0083
Other (calculated)	0.0272
Total Average	\$0.2638

A big responsibility of management is that of infecting supervisors, foremen and employees with enthusiasm for maintenance. One shovel operator, one foreman, or one truck driver who doesn't care about maintenance can wreck an otherwise good program and the chance to get good costs.

First glance at our survey results may show management attitude at the plants covered to be good, since such a high percentage of the plants have the benefits of maintenance programs. Yet, the biggest maintenance "headaches" noted by the respondents indicated that top-level zeal for the programs, if any, was not transferred properly to personnel all the way down the line to supervisors and employees.

Everyone on the team has to be practical about maintenance. It's plainly not wise to sacrifice a \$50,000 piece of equipment that needs a \$25 repair job, just to keep a schedule. Neither is it wise to overload an expensive machine or otherwise abuse it for the sake of making a new production record, or for any other reason. Most of you wouldn't let an untrained man repair the refrigerator in your home, but how many good but untrained men have been assigned responsibility for operation of plant equipment costing 10, 20 times as much?

Management must provide the proper equipment to do the job in the first place. And they must know when a machine is no longer able to perform its assigned responsibilities at a cost. And this may change with a change in plant capacity, equipment obsolescence, extreme and frequent wear, or for many other reasons.

The job of keeping at efficient work the necessary tools to do the needed job is one that never ceases. As one manufacturer put it: "Preventive maintenance begins the day that the equipment

is delivered. It stops the day you get too busy making money to protect the money that you've already made and put into capital investment."

It isn't enough just to have a preventive maintenance program. It must be made to work for you, to gain cost-reduction benefits that are available. That takes constant enthusiasm and "selling," both up and down the organization ladder.

Cost analysis and record keeping are essential parts of a good preventive-maintenance program. Without them, too many factors required for success in cutting costs—reduction of equipment downtime, keeping equipment operating at capacity, replacing equipment when needed, maintaining rebuild and overhauling schedules, etc.—aren't available to you. And an educated guess is not enough.

Here's what a plant engineer reported recently at a western maintenance conference: "Engineers have known for a long time that 'as good as possible' is not adequate quality control. 'As soon as possible' is not a schedule, nor is 'as cheap as possible' a method of cost control . . . We must have realistic systems of scheduling and cost control, and use a good management approach to make these systems work."

A services manager, speaking at the same conference, threw out this warning: "Your competition allows for no second best nor second chance. Minimum performance should be to find ways to

Table II-1—Data on maintenance spending by size of plants

Class	Avg. Size of Plant, Tons Per Year	Average Maintenance Spending	
		Per Plant	Per Ton
A—(Under 100,000 tons)	50,750	\$ 36,733	\$0.724
B—(100- 200,000 tons)	132,000	22,400	0.170
C—(201- 500,000 tons)	335,000	91,400	0.272
D—(501,000 - 1,000,000 tons)	535,000	129,500	0.226
E—(More than 1,000,000 tons)	1,450,000	390,000	0.269
Total Average	366,500	\$ 96,647	\$0.264

Table II-2—Indexes of maintenance spending by size of plants (Class C = 100)

Class	Indexes of Avg. Spending Per Plant	Indexes of Avg. Size of Plant	Ratio—Spending to Size
A	41	15	2.73 to 1
B	25	39	0.64 to 1
C	100	100	1.00 to 1
D	142	160	0.89 to 1
E	427	434	0.99 to 1

reduce operating costs by a minimum of 10 percent per year. If you think the 10-percent figure is high, take another look; your successful competitors are doing considerably better."

Results of our maintenance survey pointed out rather definitely that the aggregates industry is coming to grips with the problem. Sixty-one percent of those who replied to our questionnaire kept records of maintenance cost on each piece of major equipment in use. Significantly, 62 percent were able to say that, because data were available to them, they knew they had cut maintenance costs an average of 26 percent with an effective program.

More than one out of five respondents submitted actual maintenance costs on several types of major equipment, even though three out of five said such costs were kept. The average maintenance cost per ton for all plants reporting was 26.38 cents.

Not all who reported costs supplied unit costs on all types of equipment listed. Also, "other" costs as reported were indeterminate because of variance in combinations of costs submitted. The figure for "other" costs was calculated as the difference between reported costs by equipment type and the total average maintenance cost for all who reported maintenance expenditures and tonnage. Table I gives data on costs by type of equipment.

Survey results showed generally that maintenance spending per plant increased as average size of plant increased, as expected. (See Table II-1). But maintenance spending per ton did not decrease to a marked degree with an increase in average plant size. Data show that plants in Class B spent less per plant, and had the lowest cost per ton for maintenance among all classes. Highest per-ton costs occurred in the Class A, or smaller, plants; highest annual maintenance spending per plant was found in Class E, or larger, plants.

Table II-1 shows also the interesting fact that cost per ton for Class A (small) plants is 2.8 times the average for all plants of 100,000 tons or more in size. No information in the returned questionnaires explains this wide difference in unit cost. It is possible that more new plants are represented in Class B, or more old ones in Class A. Since we did not ask age of plant (and we see now that we should have), we are unable to account for the difference. About the same percentage of plants in each class indicated they had preventive maintenance programs.

Only a small saving in maintenance spending

Please turn page

Results of Maintenance Survey

1. Do you have an established preventive maintenance program?

78.7%—have a program
21.3%—do not

2. Do you do regular inspection and testing?

91.6%—inspect and test
8.4%—do not

3. Do you keep records of maintenance cost on each piece of major equipment in use?

61.4%—keep records
38.6%—do not

4a. Do you place responsibility for your maintenance program in one person, two, or more than two?

67.3%—1 person
21.3%—2 persons
11.4%—more than 2 persons

4b. If responsibility is placed in one person, what is his title?

69.5%—Superintendent or manager
13.9%—Maintenance superintendent or engineer
8.3%—Master mechanic
8.3%—Other

5a. Has your preventive maintenance program reduced maintenance costs below what they were before installation of the program?

62.3%—program reduced costs
9.4%—did not
28.3%—don't know

5b. What percent were costs reduced?

26.1%—average cost reduction

6. How much do you spend each year on equipment maintenance?

\$96,647—average per plant per year
.0264—average per ton

7. What are your biggest maintenance headaches? (rated in order of importance)

A—Abuse of equipment
B—High maintenance costs
C—Training of maintenance personnel
D—Other
E—Keeping good maintenance personnel
F—Delay in parts delivery
G—Keeping records
H—Receiving wrong parts or supplies
I—Lack of maintenance program
J—Mis-ordering parts or supplies

Maintenance Program Evaluation Check List*

On each of the following, enter a score which to the best of your knowledge reflects the contribution of this item as you believe it should to your maintenance effort. Use fractions if you desire.

SCORE 3—If you consider that your present utilization of this item to benefit your maintenance program is satisfactory.

SCORE 2—If you consider that your present utilization of this item to benefit your maintenance program needs improvement.

SCORE 1—If you consider that your present utilization of this item to benefit your maintenance program needs a great deal of improvement.

SCORE 0—If you consider that your present utilization of this item to benefit your maintenance program is nil.

1. MAINTENANCE ACCOUNTING

- A. Maintenance cost reports (by equipment)
- B. Other cost reports
- C. Equipment cost comparisons
- D. Replacement program based on maintenance costs
- E. Machinery and equipment properly numbered or coded to permit a mechanic identification
- F. Overtime reports
- G. Ratio of preventive maintenance to breakdown maintenance
- H. Ratio of downtime to operating time

— TOTAL $\times 100 \div 24 = \%$

2. PREVENTIVE & BREAKDOWN MAINTENANCE

- A. Equipment records
- B. Scheduled inspections
- C. Inspection check lists
- D. Work orders
- E. Lubrication routes and instructions
- F. Spare parts program
- G. Exchange assemblies
- H. Rebuilding high-wear items

— TOTAL $\times 100 \div 24 = \%$

3. CORRECTIVE MAINTENANCE

- A. Material changes
- B. Design changes
- C. Exchange and publication of improvements
- D. Problem recognition
- E. Encouragement and recognition of employee suggestions
- F. Plant engineering participation
- G. Use of manufacturer's field representatives

— TOTAL $\times 100 \div 21 = \%$

4. TRAINING

- A. Use of manufacturer's field representatives
- B. Use of dealer facilities and personnel
- C. Use of manufacturer's parts books, operating/repair manuals
- D. Skill development (specializing)
- E. Correspondence courses
- F. Informal group classes
- G. Equipment operator training
- H. Supervisor training

— TOTAL $\times 100 \div 24 = \%$

5. PRODUCTIVITY

- A. Work sampling
- B. Mechanized tools and equipment, labor-saving devices
- C. Adequate transportation facilities
- D. Ability ratings
- E. Time study
- F. Force reduction
- G. Job standardization

— TOTAL $\times 100 \div 21 = \%$

6. MANAGEMENT

- A. Communications
- B. Job planning
- C. Job scheduling
- D. Morale
- E. Labor relations
- F. Participation and enthusiasm for organized maintenance
- G. Equipment service (Minimize equipment wear and tear with smooth, dust-free roads, etc.)

— TOTAL $\times 100 \div 21 = \%$

- 1. — Total
- 2. — Total
- 3. — Total
- 4. — Total
- 5. — Total
- 6. — Total

— GRAND TOTAL $\times 100 \div 135 = \%$

*From a paper delivered by H. Hanks, Jr., Marquette Cement Co., at the May 1961 meeting of American Mining Congress in Cleveland, Ohio

You can jump profits . . .

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per plant is a benefit that comes with increasing plant size, according to this survey. Since Class A and B plants showed extremes in spending in relation to average plant size, we based a relationship study of spending and plant size on Class C plants. Indexes for average spending and size were computed, using data for Class C as the base (C = 100). Then, ratios of the class indexes were computed to show relationship of average spending per plant to average plant size. The results are given in Table II-2. Note that plants in Classes C and E are virtually equal, with a slight advantage shown for plants in Class D.

It is apparent that, based on this survey, plants with annual output of less than 100,000 tons are those that should place more accent on maintenance. They are in the best relative position to chalk up sizable savings, and more profits, through an improvement in maintenance costs.

Training of personnel, both supervisors and employees, is a "must" for efficient maintenance programs. Suitable long-range training programs include technical classes—mainly electrical, hydraulic and mechanical—for those personnel who perform the actual work. Supervisor training should be a little different, since major responsibility lies in planning, control and in handling people.

This is a rapidly changing industry, and any good training program should be designed to keep up with progress in methods and machines. "If you are doing a job as you were doing it 10 years ago," we read once, "chances are 10 to 1 that you're doing it wrong." Maintenance departments in nearly all industry have been noted for "rough-and-tough" bosses and technicians geared to "good old days" methods. That attitude in an organization today falls far short of what is needed, and changing that attitude will be a big problem in setting up a modern program. But change it you must, if you are going to take advantage of the cost savings of a good maintenance program.

Results of our survey indicated that training of maintenance personnel who handle today's programs isn't as thorough as it should be. We asked producers to score in order of their importance 10 biggest maintenance "headaches." All of the first five concerned directly or indirectly the lack of training. Heading the list of headaches, as reported, was "abuse of equipment." It would appear that the liaison between operating and maintenance personnel, and the proper training of each, would be lacking in any program where this prob-

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Let
preventive
maintenance
slash
your
safety costs

by Seymour B. Fleming*

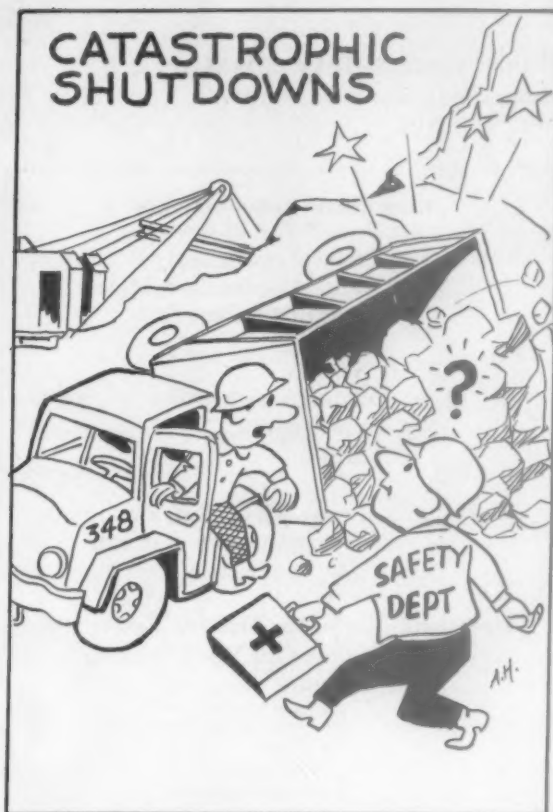
CATASTROPHIC BREAKDOWNS are far more costly and more dangerous than planned shutdowns—experience has brought this home to a leading crushed stone producer. Since instituting a formal preventive maintenance program a few years ago, New York Trap Rock Corp., West Nyack, N.Y., has found that, by planning the entire maintenance job, the proper tools, equipment and time are allotted.

It has become more and more evident to the company that a direct relationship exists between its safety program and the practice of preventive maintenance. And safety and efficiency go hand in hand; if you strive to accomplish one, the other follows as a by-product.

Good housekeeping, obviously important but often overlooked, lies at the root of a successful preventive maintenance and safety program. An important contribution is the maintenance and inspection schedule. Intervals for maintenance and inspections are based on scheduled hours or actual operating hours. As a result of assuring proper maintenance, work areas on many machines have been made safer.

For example: machine lubrication points are studied and redesigned, if necessary, to eliminate

Please turn page



*Safety Director, New York Trap Rock Co., West Nyack, N.Y.

Slash your safety costs . . .

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Truck Check—Daily—10 Hours

Check:	Oil level crankcase Oil level hydraulic system Clogged filter gauge Air leaks Oil leaks Radiator coolant Wheel nuts Tires
Clean:	Glass—windshield, etc. Wipe down interior of cab (keep it clean)
Inspection:	Refer to Drivers Safety Procedures for Truck Braking System

many dangerous points around moving machinery where a man could be seriously injured. One item on the maintenance and inspection schedule calls for clean-up of excess oil or grease on machines and machine areas.

Greater life expectancy and fewer breakdowns are the result of frequent and methodical inspections. When equipment collapses suddenly during working hours, the haste of getting it back in operation often leads to very unsafe conditions.

Accurate records are kept at New York Trap Rock on specifications and "life histories" of all types of equipment. Recording a working history highlights the number of breakdowns, their causes and the dependability of the equipment. Replacement of equipment can be forecast. Here again, accidents are eliminated because the records reveal such equipment may be more costly in maintenance repair than the price of a newer and more efficient machine. Again, to repeat: When preventive maintenance exists, injury frequency declines.

Here is a case in evidence of how an accident occurred, showing:

- (a) lack of inspection;
- (b) assuming safeguards were dependable;
- (c) lack of operator knowledge;
- (d) a look at the procedures established jointly by the safety and preventive maintenance departments to prevent a recurrence.

An experienced truck driver (9 years on present job) was traveling from a shovel to the primary

crusher in a single trailer truck. As he started over the brow of the hill going down to the primary crusher, he applied his brakes, discovering at that moment he had no brakes. The driver claimed he looked at the air pressure indicator and stated it read zero. He drove towards the left bank off the road. The tractor and trailer came to almost a complete halt when it went into the side of the bank. Immediately thereafter, the trailer overturned and the tractor followed. Fortunately, the driver was not injured.

The safety personnel arrived at the scene of the accident minutes after it happened. The V-belt on the compressor was found broken, thereby preventing the build-up of any air pressure; the trailer brakes were found to be locked as it was lying on its side. It may be assumed from skid marks that the emergency trailer brakes locked just prior to the trailer overturning. Keep in mind that the driver stated the air pressure indicator read zero when he applied his brakes after he started over the brow of the hill. If this was so, the emergency trailer brakes were supposed to lock automatically when air pressure decreased to 35 lb.

Upon questioning the driver and the garage foreman, it was learned that the safety buzzer, indicating air pressure of 60 lb. and less, was disconnected. It was stated that the buzzer was not operating correctly, which was the reason for temporarily disconnecting it. There is a possibility that if the buzzer had been operating, the driver would have been aware of low air pressure before descending the hill and the accident would not have occurred. However, it is possible that this type of accident still could have occurred even if the buzzer was operating. Tests made on this unit and on similar units showed the lack of dependability of the automatic trailer brake system.

Results of four tests on the truck involved in the accident were:

- (a) amount of pressure at start of test: 90 lb.;
- (b) buzzer began operating at 60 lb.;
- (c) trailer brakes automatically locked at zero;
- (d) time lapse between buzzer operating and trailer brakes locking: 21 sec.;
- (e) air pressure gauge registered zero 4 to 5 sec. before trailer brakes automatically locked.

Average of other units tested showed:

- (a) amount of air pressure at start of test: 90 pounds;
- (b) buzzer began operating at 40 lb.;
- (c) trailer brakes automatically locked at 10 lb.;
- (d) time lapse between the sound of the buzzer and trailer brakes locking—12 sec.;

(e) in rebuilding pressure, buzzer stopped at 45 pounds;

(f) trailer brakes released at about 58 lb.

From the tests made on these units, it was easy to realize the lack of dependability and inconsistency of the automatic trailer brake system with which our trucks were provided. The time lapse before brakes automatically locked was intolerable. So much could happen to the driver and equipment in the time interval. Significantly, many of the facts we uncovered were unknown to the distributor of this automatic safety equipment.

The truck in question was equipped with an emergency switch that could be operated manually by the driver. There is a separate air tank on the trailer, and when this hand lever is operated, it immediately locks the trailer brakes from this reserve tank. We are certain that the driver, if he had used this brake, would have not found it necessary to crash into the bank and overturn.

This brought up a question. Are our drivers thoroughly familiar with all the safeguards on our trucks?

As a result of the information gathered, all trucks were equipped with:

(a) a dependable valve that would automatically lock trailer brakes when air pressure fell below 35 pounds;

(b) low-pressure flag indicators. (These small flags, mounted in the cab in front of the operator, drop when air pressure decreases to 60 lb. They were provided in case the buzzer indicators failed.)

The preventive maintenance department established a 100-hr. inspection and testing procedure for emergency braking equipment, and a daily drivers' safety procedure for truck braking systems, to guarantee that the equipment provided was maintained properly.

Because preventive maintenance calls for a critical study of tools, as well as time and equipment, the natural result is a changeover to more automatic and efficient tools. For example, air wrenches have been substituted for hand tools. Moreover, whenever a demonstration of a new type of tool or equipment is planned by the preventive maintenance department, the safety department is required to be present and to submit a report after the demonstration, listing the safety features or lack thereof, and making any suggestions or recommendations that are helpful.

These are but a few examples of joint effort toward a goal that is common to industry: reduce costs. For in New York Trap Rock we have found that proper preventive maintenance plus proper

Truck Check—100 Hours Include 10 & 50-Hour Check

Check:	Clutch—free pedal Fan belt—tension and condition Pop-off safety valve Radiator mounting bolts Motor mounting bolts
Change:	Crankcase oil
Lubrication:	Universal joints
Service:	Oil filters Radiator mounting bolts Motor mounting bolts Safety check—brakes
Inspect:	Emergency brake inspection procedure <u>Unlicensed</u> Low air buzzer Low air flag indicator Emergency brake lock switch Windshield wipers Headlights Horn Rear view mirror Stone ejectors Safety chains Trailer hitches Muffler <u>Licensed</u> (including unlicensed inspection check) State inspection Stop lights—2 Tail lights—2 Head lights—2 Parking lights—2 Identification—Clearance 2 Direction signals Flares—8 hr. Mud guards and flaps General appearance Reflectors: Side—1 amber, 1 red Rear—2 red

safety measures equal maximum production at minimum cost.

New York Trap Rock Corp. operates four open-pit stone quarries and a shipyard on the Hudson River, within 70 mi. of New York City. The company annually supplies to the latter area some 7 million tons of top-quality graded crushed stone, rip rap, and by-products, most of which is delivered by a fleet of 240 company-owned deck scows. Motive power for this scow fleet is supplied by tugs from a subsidiary towing company. The minerals quarried are diabase produced at two quarries, and dolomite at the remaining two.

END



Send your service

Left: The latest in visual aids and a well-equipped classroom help get the point across to these Caterpillar students

PROFIT MARGINS ARE PINCHING many a rock products producer, and his increasing cost consciousness should lead him to take a long, hard look at his staff. Are the men equipped to handle not only routine servicing but a complete overhaul when an emergency arises? Most important, have they been thoroughly indoctrinated in the rules of preventive maintenance?

Practically on your doorstep are numerous opportunities to train your men—mechanics, superintendents, foremen, operators, etc. This article presents only a sampling of well-established sessions that vary considerably in approach, intent and method.

Training itself is almost always free, leaving the customer (in the case of the factory-held schools) to pay for transportation, housing and meals. Such a cost is usually more than justified, however, as your "students" come back full of helpful advice for their fellow workers, often bringing charts, diagrams and other visual aids in the bargain. Generally, inquiries should be handled through your dealer or distributor.

The men responsible for this maintenance training really believe in it and approach the sessions with enthusiasm. And all these schools like to train customer people. In fact, several managers admitted that they prefer to train customer personnel because of their more genuine interest, greater average experience and lower turnover.

You are probably well aware that most equipment manufacturers send a service representative along at the time of major purchases or when introducing complex changes. Often this man will devote several days to making necessary adjustments and training the staff in operation and upkeep. Sometimes the instructors do this work; at most of the companies visited the instructors refreshed and added to their practical knowledge by troubleshooting and field work.

Needless to say, ROCK PRODUCTS urges its readers to try to fit one or more maintenance training sessions into their plans for progress.

WE PREFER TO CALL IT PRODUCTIVE rather than preventive maintenance," says Caterpillar Tractor Co.'s Assistant Service Manager E. M. Iverson. "And the demand for maintenance training is encouraging, particularly at the grass roots level."

Dealers are responsible for almost all training of Caterpillar customers, and their incentive as expressed in the company-provided Cat-Care Meeting Guide is "to establish a preference for Caterpillar equipment through the extended life gained by better maintenance practices". This company tries never to come between its 290 dealers and their customers, feeling that the dealers are better able to judge the customers' varying training needs. However, the parent organization backs them up with home-produced films, filmstrips, maintenance guides, booklets, charts and posters, available either free or at cost.

Cat-Care schools are usually held during the winter slack season, and even then most often during Saturday or evening hours so as not to take men from their jobs. Lasting anywhere from 2 to 7 hours, depending upon type and amount of equipment covered, they are each aimed at a specific market. The dealer is responsible for advertising and setting up the meeting space. Service representatives are available for consultation.

What awaits your personnel, once they've been "enrolled" for Cat-Care? For one thing, service talks amply enlivened with visual aids. An ingenious Virginia dealer attaches discarded parts to 2 x 4 ft. boards, labeling them "Cooling System," "Fuel System," "Air Induction System," "Gaskets and Seals," "Filters," "Abuse and Neglect" and "Roller and Idler Rebuilding." The sadly ruined parts on the "Abuse and Neglect" board dramatically bring home the need for thorough maintenance practices. Also, there is plenty of chance for discussion through panels and question-and-answer periods. Although time is too short for actual work on machinery, instructors frequently bring

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men to school

by Enid W. Stearn

Send your service men to school . . .

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in components for demonstration. Badges, wallet cards and door prizes provide pleasant mementos.

And these Cat service men really know what they're talking about after they've been through the Peoria (Ill.) Factory Training School. There, a staff of 21 engineer-instructors teaches nine 40-hour courses (one is a Service Instructor's Conference). Eight classrooms and a large theater are furnished with the latest in audiovisual equipment, components mounted on casters for movability, air, electricity—even overhead cranes to bring the larger parts right into class. Adjacent is the huge machinery bay for actual teardown.

Caterpillar officials point out that much on-the-spot training in both operation and maintenance is given at the time new machinery is delivered. The dealer service representative can be on hand as long as a week, assisting customer's men. And an additional source of maintenance tips is the Service Reporter, a quarterly translated into French, Spanish and Portuguese.

RED CARPET TREATMENT and a most thorough service education await you and your maintenance men at LeTourneau-Westinghouse Co., Peoria, Ill. Here, customer and dealer personnel receive the same training, and the customer is equally encouraged to enter into the problem-solving session.

With a handful of tools in an out-of-the-way corner, Service Training Manager L. A. Armstrong first set up maintenance classes on the earth-moving equipment back in 1941. Now, separate Earth-moving, Grader and Truck Schools can spread out into 5 air-conditioned classrooms, 2 theaters, 2 student lounges and the large equipment area.

Of the three types of schools mentioned above, the Truck School, started just a year ago, is probably of most interest to rock products producers. Mr. Armstrong estimates that his department will hold about 10 of these per season. Like the others, each is a 2-week session with from 6 to 18 attending. Two instructors are usually assigned; one assists the less experienced. Average student experience is 6 to 10 years.

All six LeTourneau-Westinghouse instructors are practical people with strong service backgrounds. They are given the opportunity to work with the engineering department on pilot models, so that they become familiar with all equipment from its earliest phases. And they also have at their command an exceptionally complete array of training aids, almost all company-developed.

Numerous working models, components and cutaways are easily accessible, and even the lounge areas are decorated with displays—including a Chinese mirror presentation of electrical circuits. Two of the classrooms are specialized. The electrical classroom contains a board-mounted model of the electrical connections on a steering mechanism, actuated by a generator. There are also components sawed in half to reveal the action, and a wired board on which students learn to connect circuits. The mechanical classroom has power trains in cutaways, all types of transmissions, working models and "exploded" parts.

Components are taught in order: frame; transmission and clutches; drive line; rear end and differential; power steering; general hydraulics; body, and optional equipment. A typical class—for example, on transmission—would begin with a general lecture and instructions on how to remove it. After removal, the students disassemble, study and reassemble the transmission, with each step prefaced by a talk from the instructor. After a review and a written exam, the class is ready for instruction on field maintenance and adjustments, and finally for reinstallation of the component. Mr. Armstrong's theory is that every important fact should receive seven forms of repetition—in slides, charts, during disassembly, during reassembly, in review, exam and workbook.

But this training is not limited to the factory. An active group of service representatives is available to explain new developments and complex changes to dealer and customer, in field and shop. (These representatives, incidentally, have proven to be valuable guinea pigs in the development of the factory schools.) Generous amounts of materials are supplied to distributors and fleet owners who carry on internal training programs. Each type of training requires a separate diploma to certify its completion. To date there are five: factory schools; mobile training schools; field sessions; distributor's internal groups, and an award for export and military uses.

All over the country, from October through April, the LeTourneau-Westinghouse mobile training units carry on one of the most vital aspects of the company's training program. Furnished with 2 instructors apiece, the trucks transport a 30 x 30-ft. "classroom" which includes projection equipment, drapes, chairs, working models, cutaways and charts. Slides are the favored visual aid, as they offer each instructor more leeway.

Scheduled at one a week, the 2 to 3-day programs leave a day or two for troubleshooting in the area. Service Manager Armstrong mentions with special pride that in spite of rain, sleet and snow, his mobile units have never missed a scheduled appointment in nine years!

HERE'S A SWITCH—a maintenance training program where customer personnel get even more thorough attention than do distributors. Furthermore, Iowa Manufacturing Co.'s Cedar-rapids Maintenance and Operating Conferences welcome any and all interested persons.

Since the program started in 1946, customers have been sending welders, mechanics, sometimes whole crews. Many men have returned several times to bone up on the latest developments in crushing and bituminous equipment. Roughly 25 percent of those attending are the owners.

At present there are three 5-day sessions, generally held in the January-February slack period. Two of the conferences are aimed at customers—one on crushing and one on bituminous equipment. Dealer personnel cover both types in the third.

Preventive maintenance is the "theme song" at these meetings. "Our theory is that if equipment breaks down, you should repair not only the troublesome part but seek out the source and remedy that too," says Service Manager Boyd Titsworth. The courses follow the logical progression of components—unit—unitized plant. Considerable time is spent on the varied possibilities in arrangements of unitized plants.

Because it is necessary to train so many at a time (there have been as many as 314 customer personnel from 168 plants), the actual teaching is done at a Cedar Rapids hotel, where a ballroom is converted into a classroom for the duration. Yet the factory trips, on which the students are taken in small groups by service department guides, have proven such an important part of the conferences that Mr. Titsworth is not too eager to move the schools into the field. Occasionally, however, distributors undertake some customer training—usually on a specific type of equipment.

When it comes to visual aids, Iowa instructors are fans of the opaque projector. This is a versatile, untemperamental piece of equipment; it's simple to make on-the-spot materials for it, and the instructor has complete freedom to explain, repeat and emphasize whichever points are most pertinent. Other visual aids come into use, too; for

example, not long ago the company proudly released "Operation Installation," a sound and color film showing the step-by-step progress of a primary jaw crusher plant and secondary plant from flat car to working condition.

Men who are experienced in field service rather than graduate engineers do the training and produce the necessary materials. Realizing that they must address a wide range of experience and education, the staff members frankly admit that they speak to their classes on an everyday level. But this has paid off—especially for the many French-speaking Canadians, who now feel right at home in the group.

CENEROUS WITH MAINTENANCE TRAINING that ranges all the way from organized classes to impromptu advice on a one-of-a-kind crushing setup is Allis-Chalmers Co.

In Springfield, Ill., the Construction Machinery Division opened the doors of a fine new training center March 1. And to go along with the expanded facilities was a broadened program for customer personnel maintenance training. In previous years, only one type of customer school was held, and instructors tried to help solve each student's special problems. Now there are three types, held in series of three one-week sessions in late Fall, Winter and early Spring. They cover maintenance on: (1) the larger models of tractors, motor scrapers and motor graders; (2) medium and smaller sizes of the above equipment, and (3) tractor shovels and wheel loaders. Hydraulics systems are discussed and a thorough factory trip included.

Here, the emphasis is practical—through and through. Nine-tenths of the time is spent in the shop, actually working on the equipment and its components. An outstanding feature is the high instructor-student ratio: the customer schools usually consist of 15 to 18 men, and even this small group is divided among 3 instructors when it comes to the shop work. Allis-Chalmers has approximately 10 instructors at the center. Their varied backgrounds—from field service, engineering, proving ground—have prepared them well to tackle just about every problem that arises.

Training Center Manager Fred S. Wimberly has especial reason for pride in the many high-quality training aids produced right in the center. Over 60 cutaway models, as well as working models, component system panels and working schematics,

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Send your service men to school . . .

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have been produced by the staff in an effort to make every function as clear as possible to its students. The technical writing workshop located in the center is busily turning out instructional material a stone's throw from the training areas.

There are no written exams for customer personnel, and their requirements are considered too varied in nature to issue certificates. Dealer personnel, on the other hand, can receive certificates for a series of one-week courses in engines, air systems, diesel injection, hydraulic systems, electrical systems, transmissions, steering systems and other subjects.

If you can't spare your mechanics and foremen for a trip to Springfield, a request to your distributor will bring a fully equipped mobile training unit right to you. Two instructors put on sessions lasting from one hour to one day, and at present each unit is covering one of two basic subjects—hydraulics and diesel combustion systems.

Flexibility is the keynote for all maintenance training originating in Allis-Chalmers Industries Division, Milwaukee. The necessity of engineering processing machinery to suit individual needs results in diversified training programs.

It is the responsibility of the Advertising & Sales Promotion Department, under the supervision of E. T. Slackford, to support the product departments in designing the "packages" of training materials and arrange the sessions. Approximately 48 engineers are attached to the department, available for maintenance courses and consultation on crushing, grinding, screening and pyro-processing equipment. The courses are tailored to their capabilities as well as to the audience. However, as a group they are extremely versatile, being qualified technical writers, instructors and plant layout designers. As liaisons between sales and service, they perform a valuable function in the "brain-picking" period that precedes buying equipment and/or setting up a plant.

"Maintenance is always tied in with proper use and installation," Mr. Slackford emphasizes. "So in order to specify plans and arrange sessions, you have to have all the details from the ground up." After receiving those details, the office is ready to assemble training aids and probably create new ones. Some exceptionally effective flipcharts are a favorite device, and the company also makes many of its own slides and films. The men involved in teaching write their own lucid, down-to-earth manuals and guides.

These training programs can be informal 2-hour

demonstrations at the site of the unit. Or they can be 2 to 3-day sessions on operator adjustments and maintenance, provided for a multi-plant customer or at the time a new plant is set up. In this type, which is mainly classroom, instructors are likely to start with a simplified discussion on application. Then come special problems in plant layout and general rules for operation and installation. This is followed by specific problems and occasionally machinery overhaul. Still another type of session attempts to cover technical advances within a particular industry. Several instructors represent their specialties in the classroom.

The 9 Regional Service Representatives also take an active part in training, especially at the time machinery is purchased. They, too, are engineers, with even greater "plain dirt" experience if possible.

The Motor & Generator Department has its own training program, centered around insulation as its biggest maintenance headache. Supervisor of Marketing Services F. C. Osterland reports that at present training takes place at the distributor level. Six instructors, equipped with slides and other visual aids, often assist in these programs. In previous years, two instructors toured the country in an A-C Silco-Flex Motor Rewind Workshop on wheels.

If any doubts remain about the worth of preventive maintenance training for your employees, consider this comment of E. J. Klovers, senior engineer, grinding machinery. He estimates: Over a 25-year period, poor maintenance care of capital equipment can easily rack up costs as high as 3 to 4 times the original investment.

INTRODUCTION of its "Michigan" line of heavy-duty tractor shovels and other equipment started Clark Equipment Company well on the road to its present highly successful maintenance training program. Because the machines were mechanically revolutionary, this type of training was essential to achieve full potential and prevent damaging abuse. The result has been a program evolved from user field experience.

Now in its fourth year of operation, the school is housed in its own building in downtown St. Joseph, Mich. (adjacent to Benton Harbor). Under one roof are conveniently located offices, well-equipped classrooms for sales and service training and a large shop area. The latter is spacious enough for actual machinery to be brought in so that students can get their hands on the final

product. It also is provided with workbenches, component parts to be dismantled and reassembled, a small working model of a tractor shovel, and numerous cutaways originated for display tours.

Small groups, much personal attention, and ample opportunity to thrash out individual problems are characteristic of the one-week customer schools. Larger and smaller models are covered in separate sessions, (distributor personnel, on the other hand, are divided into basic and advanced groups). Each component and system are studied in a down-to-earth series of lecture-discussion, film or filmstrip, shop work, and final review. For shop work, the men are divided into "A," "B" and "C" groups for maximum individual opportunity. Clark instructors will tear down the machinery for customer students when required—but they are seldom called upon to do so! Service Training Supervisor Fred Johnson stresses the fact that customer students get the same thorough maintenance education that distributor personnel do; however, they are not tested nor do they receive certificates.

Through years of training, Clark has found that the most effective instructors are recruited from among long-experienced service men. Too, Mr. Johnson is able to call on a fine staff of field service representatives for expert coverage of subjects in which they specialize. Often, engine company representatives are brought in to discuss their components.

High-quality visual aids are a most important asset in the Clark sessions. Skillfully produced films and filmstrips repeat and re-emphasize even such things as providing clean surfaces for parts and discarding used O rings. At the same time, care has been taken to make them visually attractive. Export customers and distributors also reap tremendous benefit from these materials.

Considerable care and planning go into Clark's field schools, which are scheduled territory by territory, 60 days in advance. Distributors' or customers' places of business are preferred as training sites over mobile units. Customer personnel are really in the majority in these sessions, (429 were trained during the period from July 1, 1960, to May 1, 1961) which last from 2 hours to 5 days. Sometimes only the power train is covered—sometimes the "whole works."

Clark training doesn't even stop here. Students take home their self-colored flow charts and dia-

grams on which they've entered their own notes; tacked up in the service department they're a help to the whole staff. Sound filmstrips on troubleshooting and preventive maintenance are also available for showing to the home crew.

A perfect wind-up to almost every session is provided by a talk on preventive maintenance, followed by a safety film. This has special importance because so many of the men attending the schools hold responsible supervisory positions. In collaboration with the National Safety Council, Clark has produced "The Quota," an exceptionally dramatic presentation of how not to service and operate almost every type of heavy equipment. This is something every rock products producer—and his help—should see.

CUSTOMER ENTHUSIASM has really boosted the Link-Belt Speeder Corp. preventive maintenance training program since it began in 1946. Last year alone, 1,228 customer personnel benefited from 20 sessions across the country.

The tailor-made customer schools are never held at the factory but, rather, at a convenient local gathering spot, a customer's shop or distributor's place of business—whenever and wherever the demand arises. Link-Belt management feels that in most cases, field training is more convenient and economical to the customer than would be a formal factory training program. Manager of Technical Services Gene Taylor points out that the company's shovel and draglines are more complex than some other types of machinery and, therefore, these training sessions are beneficial to the customer when performing inspection and conducting preventive maintenance programs.

Highly important to the success of these schools are the 11 Regional Service Representatives. "The service reps' main function is training, training, training—both customers and distributors," according to Taylor. When larger groups are assembled—they range from 20 to 80—he or his assistant go out to lend a hand. All of the instructors are heavy on experience; they've spent an average of 12 years learning the ins and outs of shovel-cranes.

All shovel-cranes, not just the Link-Belt products, are covered in the programs, stressing general preventive maintenance, safe operating procedures and lubrication. They average 3 hours in length, usually beginning with an introductory

Please turn page

Send your service men to school . . .

continued from page 99

film on the equipment itself and winding up with "A Penny Saved," a movie summary of maintenance procedures. The rest of the program varies, but there is always much attention devoted to the Speed-O-Matic hydraulic control system. A portable working model of the latter is provided. Neither exams nor certificates are given; Link-Belt feels that all too often maintenance and operating proficiency don't go hand in hand with literary skill.

It is interesting to note that the operating unions have become intrigued, and are requesting these maintenance schools on their own time and at their own meeting places.

MELROSE TECH IS NO MISNOMER for the International Harvester Construction Equipment Division maintenance training school. At its Melrose Park, Ill., headquarters, the well-integrated Service Development Department runs a year-round program that is simultaneously adaptable and academically strict in its course presentation and rating standards.

J. W. Duncan, supervisor of Service Development & Training, heads a live-wire staff of approximately a dozen technicians who double as instructors, technical writers, photographers, movie cameramen, artists and shop layout designers. Written materials are printed on the company's own offset presses, and a couple of the men have become such skilled moviemakers that they take on assignments from other company departments. Quite a few of the staff have worked their way up through the company, and all are either graduate engineers or have equivalent experience.

"Our goal is to provide maintenance training for anyone—anywhere—who is responsible for our equipment," Mr. Duncan states. Emphasis in all training, whether in factory sessions, distributor meetings or at the job site, is on the practical approach, and roughly two-thirds of the students' time is spent with the machinery itself. Because of this, classes are held in groups or multiples of six.

The average factory class lasts a week, and a training plan is designed individually for each one. On entering, students are encouraged to submit questions, and the problems they bring up to some extent guide the emphasis of the course. At the close of most sessions, management personnel are invited in for an open forum—a very popular question and answer period with the students. Mr. Duncan stresses four important points in getting a fact across: illustration, demonstra-

tion, actual student experience on the component or machine, and the objective exam. These are enforced and reinforced in the shop, classroom and in an auditorium provided with remote-controlled projection equipment.

At this time, most customer personnel are trained at the distributor's or in the field, using Melrose Tech training aids. These shorter sessions are usually held after working hours and focus on one component. Staff-planned "packages" containing illustrated manuals, film strips and records are available at low cost to customers, operator's schools and unions, through International distributors. Many of the filmstrips are correlated with detailed course outlines, making it easier for a student to review on his own time. A rather unusual technique often used in International Harvester courses is to show a step-by-step procedure on the screen while the work is progressing.

Cosmopolitan in range, many of the courses are translated into foreign languages both here and abroad. Turkish demand was so great that a special school was arranged. At the time of the writer's visit, Indian, British, Venezuelan, Colombian and Arabian students were taking advantage of the fine facilities at Melrose Tech.

An eager reception greeted a new variety of "package" program, aimed primarily at equipment owners and their supervisors. Scheduled Maintenance courses for each type of equipment have been available for approximately two years. With this systematic series of checks and adjustments, downtime and maintenance can be efficiently planned ahead. International Harvester encourages keeping a file on every piece of equipment, a master plan on view in every shop and the use of operator shift tickets to scent out problems before they grow to troublesome proportion.

Only 36 men have been able to achieve the gold Master Service Technician pin since training began 5 years ago. The challenging requirements for this rating are: 8 years continuous service experience, plus 2 years shop administration; passing grades in 50 Melrose Tech courses, and contributing to service training by the presentation of at least 25 of these courses. The Service Technician No. 1 rating involves 4 years' experience, 30 courses successfully passed and 5 training courses organized. To rank as a Service Technician No. 2, it is necessary to have 2 years' experience and satisfactorily complete 15 courses. Too, progress, job experience and education are carefully recorded and preserved on file for every student.

END

crusher
rolls
restored
to size
automatically



with **STOODY** **CRUSHERMATIC**

Now you can rebuild your crusher rolls to size and hard-face them automatically *in position!* The **STOODY CRUSHERMATIC**, a Stody portable automatic welding system, temporarily suspends over the crusher rolls; can be used with your regular semi-automatic wire feeding unit and a power supply of adequate capacity.

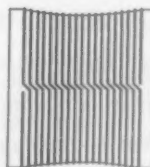
Cuts Maintenance Overhead 50%
Because welding is continuous, mainte-

nance costs are drastically reduced. **Crushermatic** actually deposits up to 20 lbs per hour on continuous duty...300% faster than manual welding and 200% faster than hand-held semi-automatic welding!

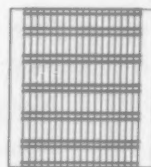
Easy on the Weldor

Crushermatic takes the work out of welding—takes the weldor out of the crusher! All necessary controls are *outside*; the weldor works in clean smoke-free air, in comfort.

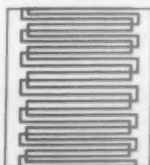
VERSATILE WELDING PATTERNS



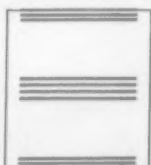
Circumferential
Welding



Consolidated
Transverse Striping



Continuous
Wide Striping

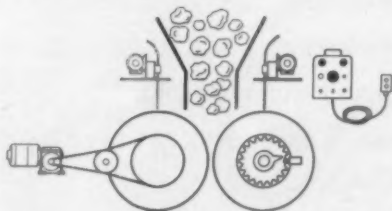


Sectional
Close Striping

Electronic controls in the **Crushermatic** unit permit a wide variety of welding patterns, producing virtually any desired bead spacing. The illustrations show typical possibilities.

SIMPLE INSTALLATION

Permanent brackets are welded in the crusher supporting the **CRUSHERMATIC** unit in proper position over the rolls. In some cases it is necessary to cut an entry door through the crusher chassis and to fabricate a removable access cover in the screening hopper to expose the roll.



For more production, greater crushing uniformity, faster, more economical maintenance, get the facts on **Stody CRUSHERMATIC!** Free illustrated folder on request.

STOODY COMPANY

11942 East Slauson Avenue
Whittier, California

Enter 1246 on Reader Card

**"Euclid scrapers have tripled our yardage
...cut cycle time 60%"**

**"In 3 years only two day's downtime
for each of our 3 'Euc' Rear-Dumps"**



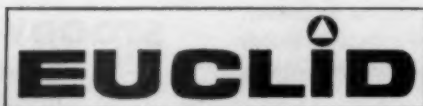
W. A. Schemmer Limestone Quarry, Inc. at Logan, Iowa produces 1500 tons of crushed stone per day ... close to a half million tons annually ... for highway construction, river stabilization work and agriculture. Up to 70 feet of overburden has to be removed from the 30 feet of limestone.

Replacing crawler-drawn scrapers, two Euclid TS-24 Scrapers are now used for stripping. They have greatly reduced costs on this phase of the operation. Cycle time from the stripping area to spoil bank and return has been reduced by 60% and yardage moved per hour has more than tripled. First major repair work was done after 4000 hours of operation on the first "Twin" that went into service in January of 1957. There has been no downtime on the other "Euc" that has

been working 17 hours a day since April, 1960.

On a half-mile round trip from the loading shovel to the crusher, three R-10 Rear-Dump "Eucs" haul a total of 1500 tons per 10-hour day. Working an average of 250 days a year, these 10-ton haulers have posted a fine availability and low maintenance cost record. In three years of operation the 3 "Eucs" have required no major overhaul and there has been only two days of downtime for each machine during that long period.

Prior to going into the quarry business in 1948, Mr. Schemmer had his own highway construction firm so he speaks from long experience with heavy equipment when he says, "The extremely low operating cost of our Euclid scrapers and trucks has been a major factor in the success of our quarry operations".



FOR MOVING EARTH, ROCK, COAL AND ORE



"Two Euclid TS-24 Scrapers and three R-10
Rear-Dumps enable us to turn a profit stripping
70 feet of overburden for 30 feet of limestone".

W. A. Schemmer, Pres., W. A. Schemmer Limestone Quarry, Inc.

EUCLID Division of General Motors
Hudson, Ohio

*Plants at Cleveland and Hudson, Ohio
and Lanarkshire, Scotland*





For some parts, shop maintenance has advantages over field maintenance

Part 1*

Here's how to slim your hard-facing budget

JUST HOW IMPORTANT is hard-facing to your operation? Certainly, it's important enough to justify a real study of the process—of what can be expected of the various types of electrodes and rods. Certainly, too, it's worth your while to educate your maintenance men to supervise the actual welding and keep accurate performance records.

Hard-facing might have a bad name around your shop. Perhaps several foreman or superintendents have tried it with indifferent success because they didn't understand all the fundamentals. Maybe they used the wrong materials for the job—or the wrong technique. At any rate, if one badly planned job went haywire, the word probably got around that "hard-facing's no good."

Sometimes the welder himself is responsible for selecting the materials. Being human, he may all too often choose the rod closest at hand or the easiest to run, regardless of final wear results. But is he getting a chance to follow up on the actual results of his work? He should, and if he's the right man, he'll appreciate the opportunity and turn in far more effective work.

"How much added service life?" is the primary question anyone should ask about a hard-facing rod. Until this is answered satisfactorily, cost per pound is the least important consideration, con-

Please turn to page 106

*This is the first of three articles on the basic features of hard-facing. In future issues, the automatic and semi-automatic procedures in common use will be covered

the new

KONE-O-MATIC®



- With the KONE-O-MATIC Crusher, setting is sensed and held in position automatically by a multi-piston, fully hydraulic suspension system!
- Tramp iron is automatically released and KONE-O-MATIC is back to its setting fast, with no strain, shock, bump or damage!
- Setting can be changed instantaneously by finger-tip control without shutdown!

- And the new KONE-O-MATIC's feed opening is lower and larger, size for size, than any other crusher we know of!

These, and many other exclusive features, add up to more productive hours per year, and therefore, more output; to fewer operating headaches; to a more evenly sized product; and best of all, you'll save on overall operating cost! This has been proven in actual quarry operations! We know you'll like the KONE-O-MATIC!

Send today for the new KENNEDY
KONE-O-MATIC Bulletin, KOM-61.



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MANUFACTURING & ENGINEERING CORPORATION
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Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Rod, Ball & Tube Mills • Rotary Kilns & Kiln Accessories
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Slim your hard-facing budget . . .

continued from page 104

trary to the interest of a lot of amateurs in this business. The right type of material for a specific job will produce maximum service life, reduce the need for frequent replacement of worn parts and save hours of welding time. In short, it cuts maintenance costs throughout.

Each type of hard-facing rod has distinct properties of deposit to meet varying kinds of wear. Find the right material for your specific job and forget about price. It takes just as much welding time to put down a pound of cheap, inadequate rod as to hard-face with a pound of long-wearing hard metal. Remember that the major part of your initial cost is welding time; the few pennies you may save in materials will show up later as dollars lost in the sacrifice of long service life, in more frequent replacements and in lost production due to part failure.

There's a bigger investment in time and effort to do a good job . . .



But a high price doesn't always guarantee top-notch service; the wear factors involved dictate the type of material to be used on any given job, and under many circumstances a moderately priced rod will outperform costlier ones. Shovel bucket teeth and mill hammers, for example, are subject to severe abrasion coupled with very heavy impact; for such service the best answer is usually an inexpensive low-alloy material that has high-impact strength. For some wearing parts, even inexpensive cast iron electrodes will get the desired results; for others, stainless at a higher first cost will prove most economical in the long run.

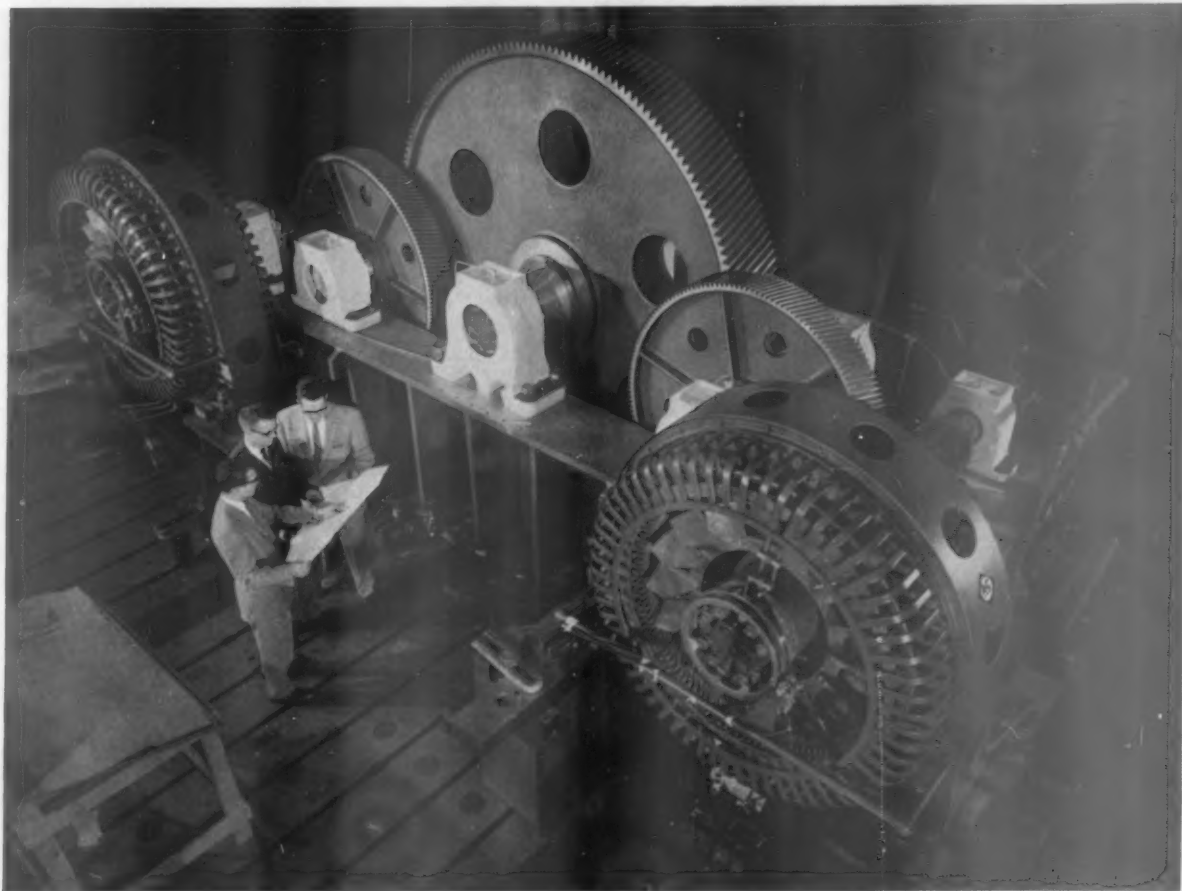
On the other hand, in operations where impact is secondary and sliding abrasion is the chief wear factor, as with washers or pug mill paddles, it is necessary to go to rods of high alloy content that provide extreme resistance to wear and will polish in service. Price will, of course, be higher. Or you may find that for certain situations involving the

Please turn to page 108

. . . of resurfacing heavy production equipment with the material to do the best job



ALLIS-CHALMERS



Twinducer is an Allis-Chalmers trademark.

Full-load demonstration proves 98%-plus efficiency of Twinducer grinding mill drive

New, twin-motor drive system divides mill load electrically, saves space and installation costs, extends gear-train life.

To show the high efficiency of the *Twinducer* drive, Allis-Chalmers engineers recently conducted a series of full-load demonstrations at the factory.

Full load was simulated by coupling two *Twinducer* drives. Driver unit was coupled to driven unit. Load on driven unit was two equally loaded generators.

Power input to the motors was measured, and compared with the output of the generators. Efficiencies (exclusive of ordinary motor and

generator power losses) were found to range from 98.48% to 98.52%... more than twice the efficiency of most conventional mill drives.

The *Twinducer* drive balances the load electrically, through a unique, angular rotor shift of one motor. Result is a drive arrangement that takes less space than other trunnion drives... and facilitates automation of grinding equipment. *Twinducer* drive cuts maintenance costs, conserves power requirements and greatly extends gear-train life.

For complete information on the new *Twinducer* drive system, see your A-C representative. Or write **Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.**

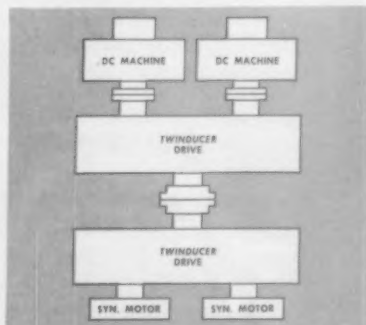


Diagram of *Twinducer* drive demonstration. Load is balanced electrically by a rotor shift mechanism in one of the twin synchronous drive motors. A-1514

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Slim your hard-facing budget . . .

continued from page 106

severest type of abrasion only the costly tungsten carbide rods will do the job. Only actual tests and complete performance records will give valid answers for your own work.

If you are in doubt about the right build-up and hard-facing materials for the jobs you have to do, your local welding supply dealer—granting that he really knows his business—can give you valuable assistance. He carries a full line of recognized alloys, with detailed literature describing uses and application procedures for each. Further, this dealer knows local conditions, knows what others in your line are doing and is able to give you the benefit of his experience. In following the recommendations of the manufacturer's literature and your dealer's advice, you will not go far astray.

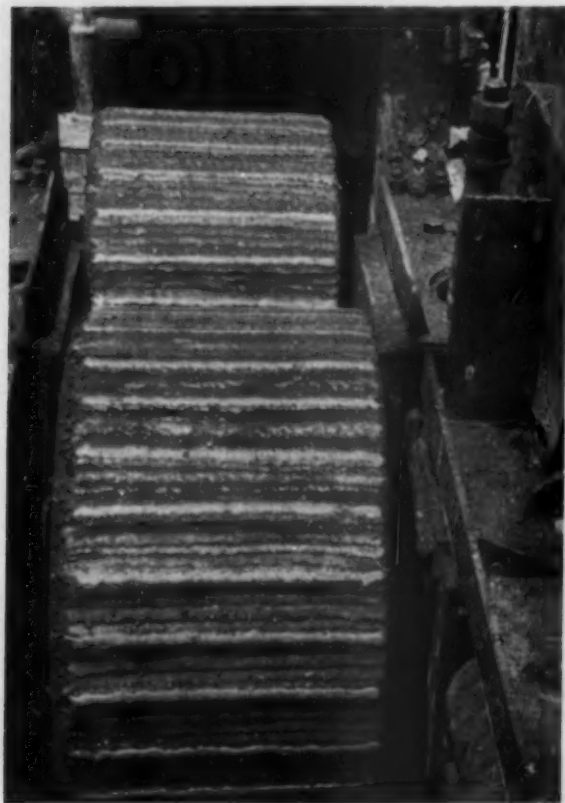
Another service available to you should not be overlooked. Your dealer has at his command the

field service force of his supplier to help you in meeting unusual problems; these factory men are hard-facing specialists with long experience and their assistance may be had at no cost to either you or the dealer. Don't hesitate to ask for their help whenever you need it. They can save you needless experimenting and costly errors.

A final word on planning welding schedules: In the average plant the rebuilding and hardfacing of wearing equipment is not a full-time job; usually it can be handled as fill-in work to be done when slack time allows. To make the most of the welder's time, many shops carry a small replacement stock of those wearing parts most frequently required; the welder rebuilds the worn parts as they are withdrawn from service, insuring that needed replacements are always available for immediate installation. In such a situation the investment in reserve parts is small and costly downtime is reduced to a minimum.

END

Different jobs often call for radically different hard-facing materials . . .



. . . applied in different ways to achieve the best results on your equipment



ALLIS-CHALMERS



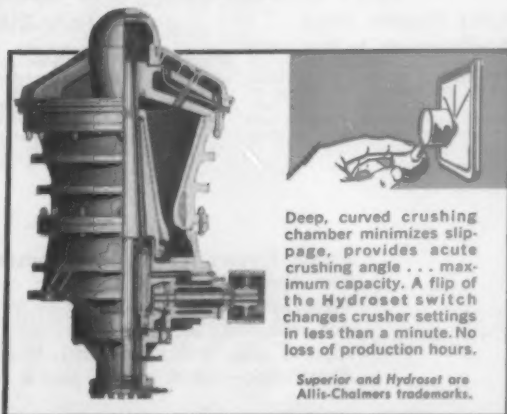
One-man, one-minute product control on these **brawny boulder busters!**

Hydroset mechanism keys Superior crusher performance. For crushing the hardest materials — year in, year out — *Superior* crushers have strength where it counts. They lead the field in dependability and continuous service and, at the same time, give you high capacity and low operating costs.

Best yet, these rock-rugged crushers do it with a flip of the switch. With *Hydroset* mechanism, it takes one man less than one minute for complete product control. This exclusive mechanism compensates for wear, retains initial setting or changes settings in less than 60 seconds. Clears jams just as easily. Slashes downtime and maintenance costs to the bone.

You'll see all the top-profit advantages in *Bulletin 07B7870A*. For your copy, call your A-C representative or write **Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.**

A-1329



Deep, curved crushing chamber minimizes slippage, provides acute crushing angle... maximum capacity. A flip of the *Hydroset* switch changes crusher settings in less than a minute. No loss of production hours.

Superior and *Hydroset* are Allis-Chalmers trademarks.

Union Wire Rope

In Union, There Is Quality That Responds



The rated capacity of a wire rope is based on the breaking strength (catalog) divided by a safety factor applicable to the type of service or use. The grade of steel, type of construction and size of the rope determine tensile strength. It must be properly related to the loads it will carry, or costly and dangerous early failures are likely to occur.



Strangled by a Misfit Sheave

When the groove of a sheave is too small for the rope diameter, pinching action quickly destroys the rope—especially when it's overloaded. The victim shown here was knocked out in just 1½ hours of service.

UNION Wire Rope Tuffys—Famed For Tough Job Performance



Tuffy Scraper Rope

Flexible enough to take sharp bends; stiff enough to resist looping and kinking when slack; highly resistant to the shock of load impact—that's Tuffy balanced construction. Mount a reel on your scraper—save wasting sound rope.



Tuffy Slings and Hoist Lines

Slings are a patented, 9-part machine-braided wire fabric that is next to impossible to knot or kink. Hoist lines have built-in strength, toughness, flexibility. Balanced—a top-performing team for handling every type of material. In addition to Tuffy, Union Wire Rope furnishes a complete line of slings.



Tuffy Dozer Rope

Mounts right on your dozer in a 150' reel. When rope shows wear, just feed through enough to replace the damaged part. Saves rope, gives you a bonus of extra service. Also available in 300' and 500' reels.

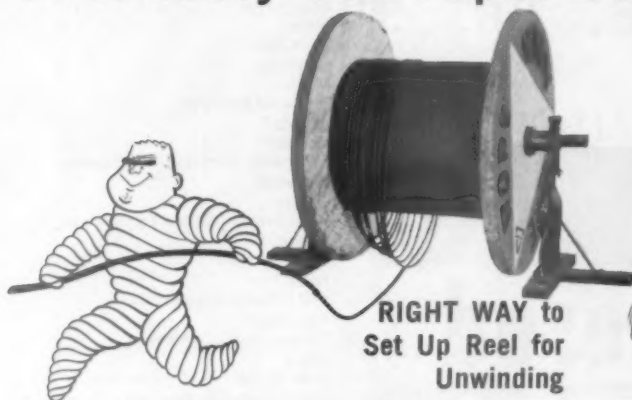


Union Knows the Ropes—Comes Up With Solutions To Wire Rope Problems And we have 'em—more than 1600 standard constructions. Add to that the famous Tuffy family of special ropes and slings, custom-made for special needs and special uses. If none of these fit your needs, our research laboratory engineers and field staff are at your service. They'll build you just the rope or sling you need—with Union toughness and Union quality all the way. Ask your Union distributor—listed in the phone book Yellow Pages.

Tuffy Tips

New steels are
born at
Armco

Profitably To Proper Use



**RIGHT WAY to
Set Up Reel for
Unwinding**

The stock reel should be set up on jacks, so the rope will come from the under side of the reel.

In the picture (above), unwinding has started and the reel is turning faster than the rope is being pulled off. But no damage is done. Why? Because in coming from the under side of the reel, the rope is simply loosening, without forming loops or kinks.



**WRONG WAY to
Set Up Reel for
Unwinding**

The rope is coming from the top of the reel and forming loops as it overruns. These loops are likely to form kinks and dog legs, which can be ruinous to rope life.



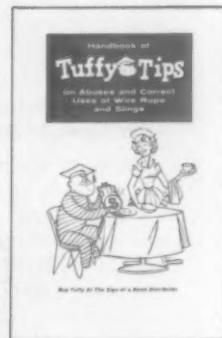
Tuffy Dragline Rope

High abrasive resistance and super flexibility. Gives long service, dependable action in handling any material—wet or dry dirt, sand, gravel, rock, minerals. Rides smoothly on grooves—hugs the drum when casting for full load.

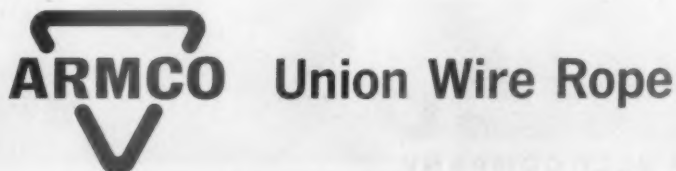


Union Wire Rope Handbook of TUFFY TIPS...Free!

The "Tuffy Tips" shown here are quoted right out of Union's handbook. In it there are dozens of other priceless hints on the correct use of wire rope. The common abuses and how to avoid them. How to save costly injuries. Maintenance tips. The proper fittings and how to apply them. Recommended sizes. Many other facts and suggestions that will cut down your rope costs and help you get out of wire rope the full service we build into it. No charge. Write Union Wire Rope, Armco Steel Corporation, 2156 Manchester Ave., Kansas City 26, Missouri.

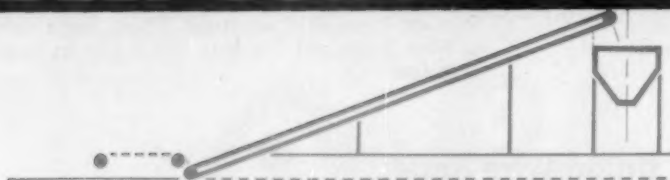


3-61



a new service...
from
your **FRANCHISED**
REX DISTRIBUTOR

REX-RATED PRECISIONeered BELT CONVEYORS



Here is a new concept in the planning and the fabrication of belt conveyors. Now you get a Rex-Rated Custom-Built Conveyor without paying custom-built prices. And you get faster installation than ever before. Rex PRECISIONeered Conveyors combine the advantages of local fabrication with factory PRE-engineering.

Your franchised distributor, using
PRE-engineering by REX, will give you

- **PROMPT QUOTATION**—The proposal and estimate can be prepared immediately—at your office!
- **PRECISE SOLUTION**—No need to "make do" with prefabricated structural members. REX-RATED, PRECISIONeered BELT CONVEYORS are tailored to your every requirement!
- **PROMPT DELIVERY**—Fabrication and assembly by your Franchised Rex Distributor assure delivery—when you need it!
- **PRICE THAT FITS YOUR NEED**—Distributor stocks of REX-BUILT Components; on-the-spot engineering; and locally available steel—combine to bring you ECONOMY.

Call the Franchised Rex Distributor nearest you—or write CHAIN Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: Rex Chainbelt (Canada) Ltd., Toronto and Montreal.

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Union Supply Co.

GEORGIA

Atlanta
Pye-Barker Supply Co.

IDAHO

Pocatello
Paul Roberts Steel—Industrial Supplies

ILLINOIS

Chicago
Dodge-Chicago Industrial Equipment Co.
Decatur
Huss & Schleiper

Peoria
Paul J. Hagerty Equipment Co.

Rock Island
Torrance Electric Company

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*These workhorses of the rock products industry can pay
handsome dividends if carefully selected*

Let's take a sharp look at belt conveyor design

by Elwood Meschter

INDOORS OR OUT, uphill, downhill or on the straight-away—whatever your location or operation—there's a belt conveyor to fit your needs. These versatile materials handlers represent one of the greatest advances in transportation since the invention of the wheel. But their very versatility makes the choice of conveyor for a particular installation a rather complex one, posing some questions to the potential buyer.

If you are in the market for a belt conveyor, you may be seeking answers to questions like these

right now: What grade of belt is best for the job? Should the conveyor be high-speed, light-load—or low-speed, heavy-load? Which would be best—thick carcass or thin, first grade or service grade? And what about splices?

Optimum performance and low maintenance costs of a single conveyor or a complete system require extensive experience and considerable engineering. However, it is possible in a brief article of this kind to examine broadly some of the more important considerations of belt conveyor design.

Please turn page

CROSS-COUNTRY BELT CONVEYORS handle some of the country's toughest haulage problems



Belt conveyor design

continued from page 113



LIGHT, portable and demountable belt conveyors have proven their worth in many segments of the rock products industry

Generally, the type of material that must be handled decides how fast a conveyor must travel to provide a good discharge from the belt. Slug-gish, damp materials like wet sand often tend to cling to the belt and, in many cases, should be carried at relatively high speeds. As a rule, hard, coarse, heavy materials, such as heavy rock or large gravel, should travel at a moderate speed to minimize damage to the belt at the loading chutes. Belt tensions sometime determine the speed within the range limited by other factors. Increasing the speed within reducing the cross-sectional load may require a more economical belt.

The belt itself is first on your list of considerations in conveyor design. Not only does it carry the load; it transmits the power to move it. The belt is the part most subject to wear and depreciation.

Your best combination of belt width and speed is determined by capacity, angle of incline, belt tensions, lump size and material characteristics. The first cost is usually lower for a narrow, high-speed conveyor, but high speeds may create problems at loading points, at transfers and on inclined portions. Often, lower over-all operating costs can be obtained with wider belts at lower speeds.

The belt you select should meet the following operating requirements: (1) strength to withstand the maximum tensions developed; (2) suffi-

cient body to support the load between idlers and withstand the impact of the load fed onto it; (3) adequate crosswise flexibility to trough properly under all conditions, (4) operational suitability.

Belt fabrics differ, both with respect to the number of plies required to support a given load, and in their ability to trough properly. Some fabrics also resist damaging effects of sharp lumps better than others. For example, both cotton and cotton-nylon are superior to rayon in moisture resistance. Nylon is superior to both cotton duck and rayon in resistance to ripping, tearing and impact. The catalogs of numerous manufacturers of belting and belt-conveyor equipment contain suggestions and recommendations of belts that will economically meet all kinds of operating conditions.

You have three choices of belt covers. Providing a protective casing for the carcass to which it is vulcanized, the cover may be from one of three standardized grades: (1) top grade, designed for extremely severe high-capacity service; (2) a medium-duty, designed for less severe service where impact conditions are reduced by small material size, and (3) a general utility-type suitable for nominal capacities of small lumps under gentle loading conditions.

The type of splice you choose must be related to the strength of the belt. These are of two kinds: mechanical fasteners that are rated 65 to 75 percent of the rated belt tension, and vulcanized splices that will develop nearly the full strength of the belt.

For high-capacity, continuously operating conveyors, the advantages of field-vulcanized splices should be considered. If you have a vulcanizer available and the additional cost can be justified, a vulcanized splice will maintain the surface of the belt on both sides, forming a smooth, endless conveyor belt. It will travel smoothly over the idlers; will bend around pulleys without injury to the belt; will permit belt cleaners to operate to best advantage, and will seal the ends of the belt against injury from moisture and fine materials.

In terminal pulleys, as in splices, a higher first cost is offset by low operating costs. It is true that pulleys with large diameters cost more and require more space and greater torque and ratios in speed-reduction equipment. But they are usually justified by savings in both first and replacement costs of the belt. It will pay you to follow manufacturers' recommended minimum diameter of pulleys

Please turn to page 116

LE ROI LRD-2

for low cost,

powerful rotary drilling

*rotary or down-the-hole drilling
... gas or diesel*

These rigs come on tires or tracks!



Here's a highly portable blasthole drill for drilling holes up to 4½ inches as deep as 30 feet... equipped for either positive-drive rotary drilling or powerful down-the-hole percussive drilling.

What's more, the LRD-2 is completely self-contained... and economically priced, too!

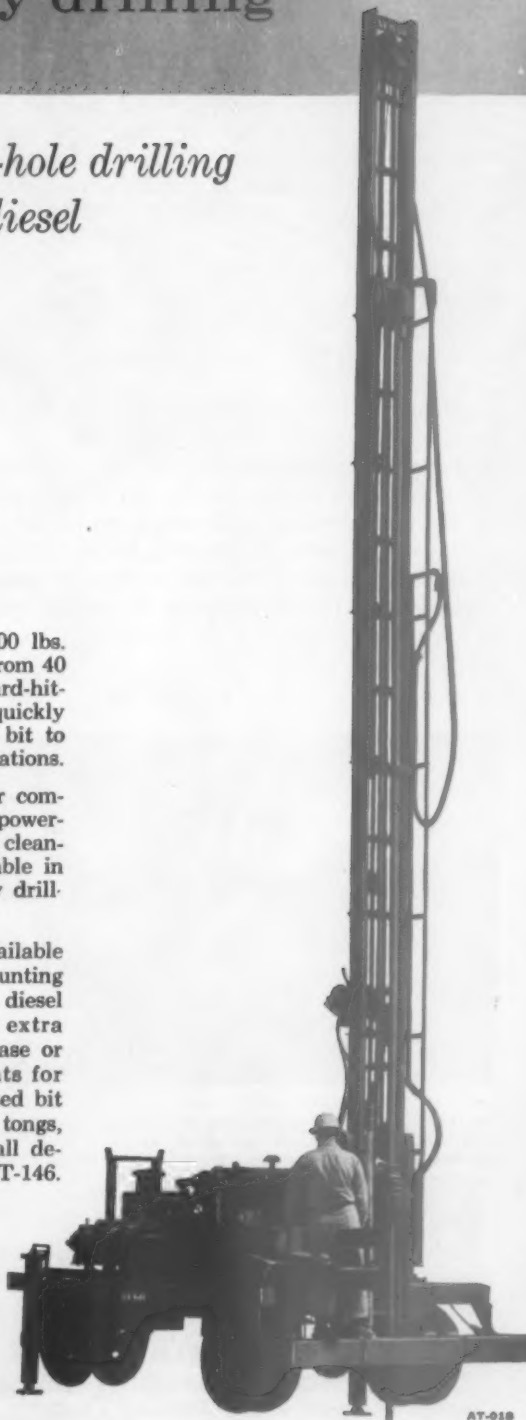
The entire unit is easily handled by one man. Controls are conveniently grouped at an operator's station located alongside the drilling area. The unit can be moved, leveling jacks hydraulically set, mast hydraulically raised, drill pipe and bits connected, and hole started all with a few non-fatiguing motions.

Powerful direct mechanical drive keeps the rotary table turning — won't bog down or lose torque under rough going like air or hydraulic driven units — eats through tough

rock formations under 10,000 lbs. pulldown pressure at speeds from 40 to 250 rpm. If necessary, a hard-hitting down-the-hole drill can quickly be substituted for the rotary bit to drill extremely hard rock formations.

A Le Roi 25 hp two-stage air compressor provides ample air for powering the down-the-hole drill and cleaning out hole... or is available in single-stage where only rotary drilling is necessary.

The self-propelled LRD-2 is available either on crawler or tire mounting and with either gasoline or diesel power unit. A whole list of extra equipment is available to ease or speed drilling, including lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, ... all detailed in Specification Sheet AT-146. Write for your copy.



LE ROI

division of Westinghouse Air Brake Co.

Sidney, Ohio

AT-010

Belt conveyor design

continued from page 114

for various functions, based on the rated tension of the belt and the shell strength of the pulley.

What will it be—a crown face, straight-faced or lagged pulley? Crown-face pulleys have a definite and desirable centering and guiding effect on the belt. However, straight-faced pulleys are a "must" under high stresses. Lagged pulleys are advantageous, especially for transmitting power when there is moisture in the material or an installation open to the weather. They are also desirable for uses other than driving, because their rubber rim coverings provide cushions to protect the surface of the belt as it passes over them. Rubber lagging, because of its resilience, tends to make pulleys self-cleaning.

Takeups—either screw-type or automatic gravity—are the next items to consider. You need these: (1) to maintain proper slack side tension, T2, or pressure of the belt on the driving pulleys for the transmission of horsepower; (2) to maintain proper tension in the belt at loading points or other places along the belt to prevent excessive sagging, and (3) to compensate for belt stretch or shrinkage.

Screw-type takeups are acceptable for belt conveyors under 100-ft. centers, but automatic-gravity takeups are definitely preferable for most conveyors over that size. The latter have such advantages as maintaining selected belt tensions without adjustments, providing no more tension than necessary to provide proper pressure of the belt on the driving pulleys under all leading conditions preventing excessive sag of the belt and eliminating frequent manual adjustments.

When you select terminal drive equipment to transmit power from the motor to the drive-pulley shaft, choose equipment as dependable and long-lived as other parts of the conveyor. Where space is adequate, you'll find that an enclosed gear speed reducer with flexible couplings is simple, dependable and easy to maintain. In limited space, an enclosed chain drive from the head shaft permits the speed reducer and motor to be located above, beneath or in front of the conveyor. The chain drive also provides a convenient means of changing speeds.

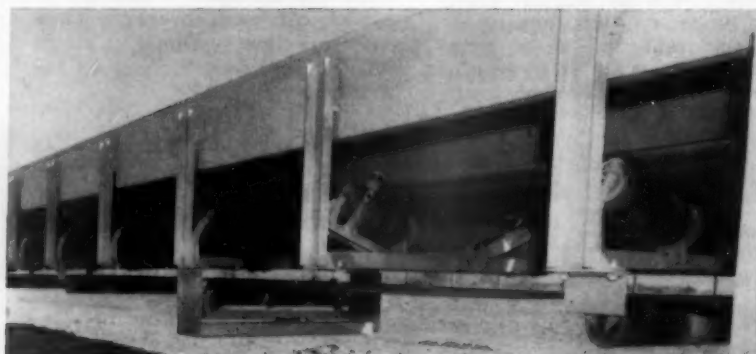
A hold back or backstop should be provided for inclined or descending conveyors to prevent them

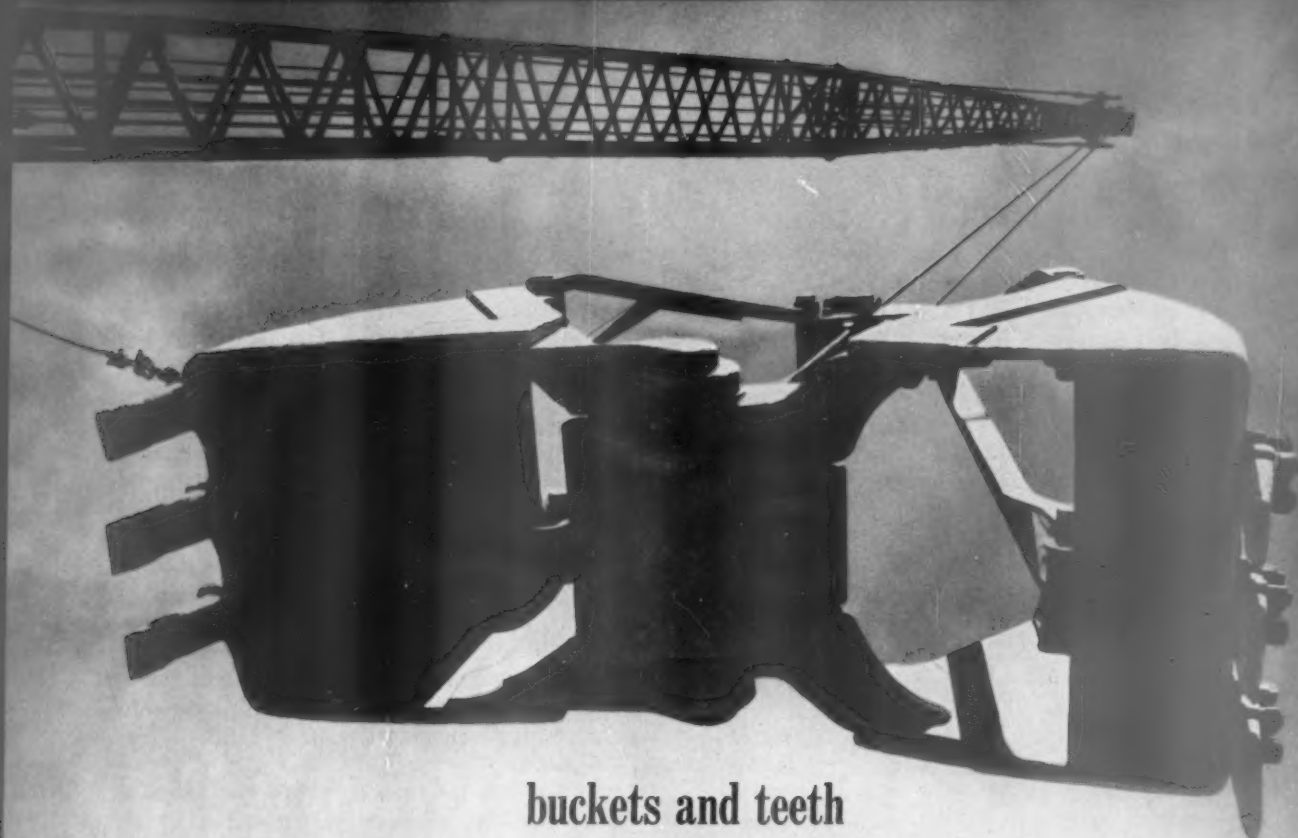
Please turn to page 118



HERE'S A MECHANICAL SPLICE of exceptional strength that overcomes some of the objections to a conventional splice
Raybestos-Manhattan photo

TRAINING IDLERS on both carrying and return runs can be a profitable investment by extending belt life and preventing belt damage





buckets and teeth
blades
tracks
sprockets
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Belt conveyor design

continued from page 116

from running backward with a load when they are stopped or when power is interrupted.

Almost any constant-speed motor is suitable for driving a belt conveyor. In a great many cases a squirrel-cage motor with "line" starting is suitable. A wide variety of drives is available for controlled acceleration. These may range from squirrel-cage motors with reduced-voltage or part-winding starting through wound-rotor motors with various types of controls to synchronous or squirrel-cage motors with eddycurrent clutches or controlled-torque couplings. Interlocking must be provided for sequence starting and stopping for systems of conveyors.

Standard belt conveyor idlers are available for service ranging from light or intermittent to continuous, heavy-duty operation. Most standard idlers have 20 and 45-deg. troughing rolls for handling bulk materials. There is a trend toward the deep-troughing rolls as more flexible belts become available. Numerous types and sizes are stock items, the selection of which is determined by the size, weight, quantity and lump size of material to be handled. The following is a broad outline of some comparative operating conditions which influence idler selection.

LIGHT DUTY	MEDIUM-TO-HEAVY DUTY
4-in. diam. ball-bearing rolls	5 to 6-in. diam. roller-bearing rolls
Capacities under 100 tph.	Capacities to maximum
Belt speeds under 300 fpm.	Belt speeds to maximum
Materials 50 lb. per cu. ft. and lighter	Materials 50 to 150 lb. per cu. ft.
Lumps not exceeding 4 in.	Lumps to maximum
Intermittent operation	Continuous operation
Seasonal operation	Year-around operation
Expendable installation	Permanent installation

Manufacturers of belt idlers publish selection tables to aid you in selecting the proper size and type of idler to suit your requirements.

Idler rolls come in various diameters and materials such as steel, gray iron and rubber tread. Larger diameters are desirable for high-speed belts and for those carrying large lumps, because they will prolong life of both idler rolls and belts. Steel rolls are used for most materials, but gray iron rolls are preferred for certain corrosive or abrasive conditions.

Rubber-tread rolls are used on carrying rolls because of their impact, absorption and on return rolls because of their ability to withstand sticky or corrosive material. Variable angle troughing rolls improve belt performance when a horizontal

run merges into an incline or decline segment of the conveyor.

Three methods of lubrication of idler bearings are generally available in standard idlers: (1) Regreasable in the field at each bearing with all grease pipes extended to one side. This method is best for large idlers and wide belts, and usually is preferred for all but relatively narrow and moderately loaded conveyors. (2) Regreasable in the field from one end, or "one-shot." This method is usually confined to medium and light-duty idlers of moderate belt width. (3) Factory-greased and sealed bearings are usually confined to conveyors of moderate widths for light or temporary duty.

The spacing of idlers is a very important factor in the over-all economy of the conveyor, since the spacing greatly influences the life of both the belt and the idlers.

If the distance between troughed belt idlers is excessive, the belt will tend to sag more, causing spillage of material and decreased belt life and requiring increased power to drive the conveyor. Heavy sharp lumps will cause more damage to high-speed belts through greater impact at the idlers when there is too much sag in the belt. You will find it economical to follow recommended idler spacing for various conditions as published by

Please turn to page 120

BELTS OF UNUSUAL DESIGN are available to handle wet aggregates up steep inclines
B. F. Goodrich photo



10 ways Du Pont can help you break more rock per dollar



It's not the cost of loading a hole that counts in quarry blasting . . . it's the cost of getting out a ton of rock.

That's why the really successful quarry men look long and hard for top quality explosives.

And it's why so many of them turn to their Du Pont representative or distributor for a complete choice of quality products . . . to take the guesswork out of every shot.

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1 DU PONT "NILITE" 101 and 202: New low-priced free-running blasting agents of medium density, ideally suited for dry holes from 2" diameter up. No field mixing; Du Pont quality performance, shot after shot.

2 DU PONT "NITRAMITE" FR: Free-running nitro-carbo-nitrate higher in density than the "Nilite" grades. Can be poured readily into wagon-drill holes as small as 2" in diameter.

3 DU PONT "NITRAMITE" 1 and 2: Quality non-cap-sensitive blasting agents which sell at reduced prices because they come in water-resistant fiber-board tubes instead of metal cans.

4 DU PONT "NITRAMON": The premium quality non-cap-sensitive blasting agent, packed in sealed metal containers to provide maximum water resistance. The ultimate in safety and dependability for modern quarry blasting.

5 NEW DU PONT HDP PRIMERS: High detonation pressure primers in 1-, 1/2-, and 1/3-pound sizes. Specially made to detonate nitro-carbo-nitrates, "Tovex" gelatin, and prill/oil mixtures.

6 NEW DU PONT "TOVEX": High velocity non-NG gelatin. Gives higher borehole density than most products on the market. Gives excellent results in hard, massive rock.

7 DU PONT DYNAMITES: A complete line of dynamites for every blasting need — each product manufactured to the rigid quality standard demanded at Du Pont.

8 NEW LOW ENERGY DETONATING CORD (LEDC): Greatly reduces noise of blasting. No need to bury trunk lines. 150 feet of LEDC makes no more noise than one electric blasting cap . . . or two inches of "Primacord".

9 DU PONT BLASTING SUPPLIES: A complete line. Blasting caps — Electric blasting caps — MS (Millisecond) Delay and the new "Acudet" Delay Electric Blasting Caps — "Primacord" MS Connectors in three delay intervals.

10 DU PONT BLASTING ACCESSORIES: Push down and condenser discharge blasting machines—Voltmeters—Rheostats.

Your Du Pont Explosives Department representative or distributor can supply further information or demonstrations of any of these products. Call him. Or write Du Pont, 2446 Nemours Building, Wilmington 98, Del.

Explosives



Better Things for Better Living . . . through Chemistry.

Belt conveyor design

continued from page 118

idler manufacturers—these are based on years of accumulated operating experience.

It is important that your conveyor belt operates centrally with respect to its idlers to avoid damage to belt edges. To insure central operation, take care that the belt is installed properly and the idlers, terminal pulleys and structures are correctly aligned. Also, be sure that the material handled is loaded centrally on the belt.

The best method of training the belt, when misalignment is not excessive, is with belt-training idlers. These are made for both carrying and return and for one-way or reversible belts. Belt-training idlers on the carrying and return runs should be placed about 50 ft. from each terminal or bend pulley and approximately 100 ft. apart thereafter.

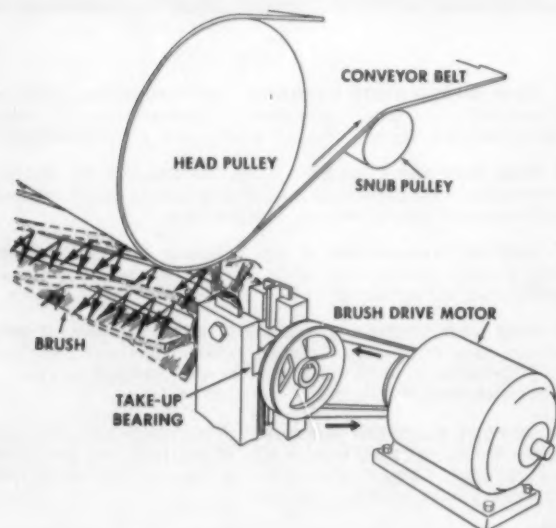
The method and equipment for loading the belt contribute much toward prolonging its life, reducing spillage to a minimum and keeping it trained during operation. The design of chutes and other loading equipment is influenced by such conditions as the capacity, size and characteristics of material handled, speed and inclination of belt,

and whether it is loaded at one or several places.

Important requirements for loading the belt are: (1) to load material at a uniform rate; (2) to load it centrally; (3) to reduce impact of falling material; (4) to deliver material in the direction of belt travel; (5) to deliver material to the belt at a velocity as near its speed as possible, and (6) to maintain a minimum angle of inclination of the belt at the loading point.

The following methods are used to discharge material from a belt: (A) discharging over an end pulley; (B) discharging over one or more fixed trippers; (C) discharging to either side over moving trippers and (D) plowing material from one or both sides of the belt by fixed or traveling plows.

This gives you an over-all view of the belt conveyor question as it involves components and installation. Now, a word about care. It is inevitable that damage will come to any belt in heavy service. Those cover gouges must be repaired as soon as possible. Here, as with splices, vulcanized repairs are most satisfactory. Use metal fasteners or repair plates only as a temporary measure until a shut-down permits repairmen to seal and protect the surface with a thorough vulcanizing job. **END**



ABOVE: A belt brush at the head pulley removes fines which might build up on return idlers and damage the belt

RIGHT: Impact idlers are a "must" under chutes or hoppers that drop sharp or heavy lumps on a belt conveyor
St. Lawrence Cement photo



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on production...
day after day
after day
after day**

**...AND YOU'LL BUY A **BUCYRUS
ERIE** SHOVEL!**





Mack-drawn hoppers at the pit are loaded with 25 tons of aggregate. They haul steadily on 9-hour shifts.

Rolling out of home base at Greenville, Ohio, one of American Aggregates' Mack tractors delivers electrical equipment for a subsidiary company, Greenville Mfg. Works.





At American's Ft. Jefferson ready-mix plant Mack mixer units take on 6-yard loads of concrete for local delivery.

Where performance counts— Moving big tonnage for American Aggregates Corp.

Throughout the Ohio Valley, the Mack trucks of American Aggregates Corporation are a familiar sight. In addition to being the country's largest sand and gravel suppliers, the company manufactures diverse products ranging from ready-mix concrete to electrical equipment. These broad operations have one thing in common—a reliance on Mack trucks and tractors to handle the many and varied hauling assignments.

Says American Aggregates' president, Mr. Edward Hole, "We've used Macks for over 20 years, so we speak from experience when we say that these trucks are capable of handling efficiently any hauling job we've ever tackled. Their performance is tops wherever we use them, and there's never been the slightest question about their durability, ruggedness and economy—4 mpg on our gas units and 7 mpg on our diesel-powered models."

American Aggregates' Ft. Jefferson sand and gravel operation is a model of efficiency. Bottom dump trailers hauled by Mack B60 series tractors, run 25-ton loads of aggregate over well kept haul roads from pit to processing plant on a 9-hour-a-day schedule... average nearly a quarter of a million tons a year. After processing the aggregate, Mack dumpers make deliveries to customers and to American Aggregates' big ready-mix operation where 6-yard Mack

mixer units handle concrete deliveries.

Modern, efficient, high-volume operations like these depend on modern efficient equipment to keep operating costs low. Macks contribute to high efficiency because of their outstanding performance characteristics. Mack Thermodyne® gasoline and diesel engines provide plenty of power for fast get-aways under full loads. Traditional Mack construction throughout reduces downtime and maintenance.

These are basic reasons why Macks are first choice where profitable operations rely on truck performance... why a Mack will pay for itself again and again by delivering top work capability per dollar invested. Your Mack representative is qualified by knowledge and experience to help you determine the Mack models that most economically meet your trucking needs. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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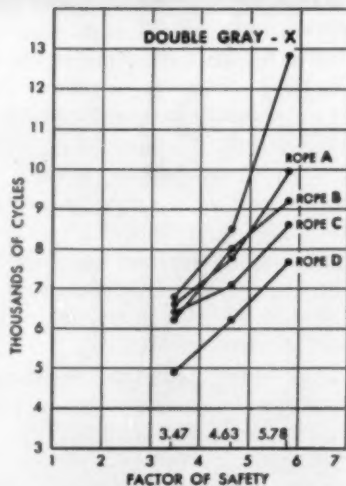
In an extended series of tests on a 25,000-lb. fatigue machine, CF&I-Wickwire's Double Gray-X outlasted four other major brands of high-strength rope at all three of the safety factors used. At the highest and most commonly-used safety factor, Double Gray-X had 45%

more bending life than the average of other ropes tested. (Please see the chart at right.)

We'd like to give you some additional information on these tests... let you read some enthusiastic field reports from satisfied users... and show you how the molecular shield on Double Gray-X can help reduce your equipment-downtime costs. Contact your nearby CF&I sales office or distributor today.

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All test ropes were 1/2" 6 x 25 FW
Preformed E.I.P.S. Lang Lay IWRC.

NCSA TACKLES GROWING INDUSTRY PROBLEMS

DISTURBING DEVELOPMENT is the polite tag that has been hung on some of the actions taken recently by government bodies—actions, that is, that have or will seriously affect the economic operation of crushed stone properties. The new moves in the chess game being played between government and industry have created some pesky problems for quarry men, who are playing for high stakes—property control and economic survival.

But the operators are rising to the challenge as a group, through their own National Crushed Stone Association. Its board of directors met July 13-14 at White Sulphur Springs, W. Va., to evaluate their position on these problems, and to take action that they believed to be in the best interests of the industry.

Please turn page

Above: Big problems get a going over by the NCSA executive committee. Members here are (seated, left to right) Charles Coburn, president; J. E. Gray, engineering director; D. C. Harper; W. P. Foss, vice president, and J. R. Boyd, executive director. Standing (l to r.); J. R. Callahan, treasurer; W. C. Rowe, past president; M. E. McLean, A. Goff

Center: Manufacturers Division held its executive committee meeting during the week the NCSA board met. Those in attendance include (seated, left to right) W. E. Collins, Jr.;* Frank Briber; L. A. Rhodes, vice chairman; Darrell Smith, chairman; Charles Coburn, NCSA president; J. W. Hardesty, and J. R. Boyd, NCSA executive director. Standing (left to right): L. A. Eiben,* W. W. King,* J. C. McLanahan* and I. F. Deister.* (*Past division chairmen)

Below: Off-session get-togethers provided the opportunity for cementing old friendships and making new ones. Mr. & Mrs. J. C. McLanahan (left) chat with Mr. & Mrs. K. K. Kinsey (right), while W. E. Collins, Jr. (rear) joins in



NCSA Meeting Report . . .

continued from page 125

Other business conducted at the meeting concerned improvement in various activities of the Association itself, including preparations for the annual Convention & Show to be held in Chicago, Ill., next February.

Percentage depletion action seems to be running against the industry. The Internal Revenue Service issued Ruling 61-17 last January. Based on the Cannelton Case decision by the Supreme Court, this ruling set the "cut-off" point for purposes of figuring depletion allowances at the primary crusher—the value of the product as it passed through the primary crusher. Estimated loss to producers of crushed stone would be thousands and thousands of dollars, if this ruling stands.

NCSA reacted quickly to this ruling. It submitted to IRS a highly persuasive brief that pointed out objections to the ruling and, apparently, was successful in impressing IRS people with the validity of those objections. The Association worked jointly with the American Mining Congress on this, but carried a major load in the hearings. In effect, the brief argued, according to NCSA counsel Jack Lane: (1) Ruling was discriminatory between stone producers; (2) ruling was discriminatory between industries.

The NCSA brief asked the IRS to recognize, for the crushed stone industry, complete depletable-ness on the production of roadstone and concrete aggregates, including material down to minus 200 mesh. Based on the Cannelton Case theory, and that of IRS, the "cut-off" should be at a point where the major volume of industry production occurs. NCSA emphasized that such would be at the roadstone and concrete-aggregate point and, further, that specifications in some cases call for minus 200-mesh material. This was the basis for the request to IRS to recognize full depletable-ness of those products and, thus, for the industry. The brief noted, too, that the crushed stone industry is analogous to the coal industry, which does get depletion on fines.

At this time, it is "premature to judge what our position should be," noted Counsel Lane. But, unless courts give beneficial rulings on depletion for the industry, it appears that the best opportunity for relief in this area lies through legislation—if the industry ever gets relief. No action is expected in this session of Congress, one way or the other.

The attitude toward depreciation has changed because of recent pronouncements by the administration and Congress. The President has proposed

a tax incentive plan, which would allow a deduction each tax year based on a percentage of whatever the depreciation was. Business reacted rather violently to this. More recently, the Ways & Means Committee of the House proposed a tax incentive that has received consideration. Designed to spur capital spending by industry, the proposal would allow a taxpayer an 8 percent tax credit on capital investment during the tax year. Generally, industry has supported this proposal, except that it wants the figure upped to 10 percent.

NCSA had adopted a formal position on depreciation in support of any proposal that would make provision for adequate depreciation reserves, taking into consideration the inflationary aspect. Because of the above government proposals, the board revised its policy in that it endorsed the Ways & Means Committee proposal, which supported a replacement cost principle. It further wired the Committee of that action, urging adoption of a 10 percent credit.

The House unit approved the proposal that carried an 8 percent figure, since the NCSA meeting. More recently, however, chances for passage of the measure have dimmed. Congress apparently is reluctant to pass any measures that will decrease revenue to Washington, since it has authorized big increases in defense spending because of the Berlin crisis.

Federal safety inspections and investigations of non-metallic mineral mines and quarries will be established, if Congress passes a new bill now in the legislative hopper. The new bill specifically excludes coal mines, since that industry already has a federal mine inspection law. It is reported that there is no specific reference to quarries as such in the bill, but there is little doubt that they are included under the non-metallic mineral mining classification.

Also, reports indicate that the proposed bill in its present form falls short of authorizing close down of quarries. The coal mine inspection law does authorize property close down under certain conditions.

The Association and the industry were caught up short by notice of hearings on this bill. One Friday in early July, notice was received that hearings were to be held on Monday and Tuesday of the following week. NCSA immediately wired the Committee to object to the inadequate notice and to request a chance to be heard in opposition to the measure. The board indicated approval of this.

Please turn to page 128



2 "automatics" do the work of 3 "stick-shift" trucks

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NCSA Meeting Report . . .

continued from page 126

Increased participation in the Association's safety work has been stimulated by members of the Accident Prevention Committee, which is headed by Seymour Fleming, New York Trap Rock Co. As a result of their efforts, 20 additional member companies entered NCSA's 1961 safety contest. Although final reports are not available, a preliminary report shows 65 plants completed the year without a disabling work injury. That number compares with 57 in 1959.

Zoning boards throughout the nation may be encouraged to zone a crushed stone operator out of business, if the Supreme Court agrees with a New York court decision in the *Goldblatt v. Hempstead* zoning case. The principle in this startling case involves the constitutionality of application by a local zoning board of an ordinance that denies a stone producer the use of his natural resources.

History of this case is most revealing. A sand and gravel producer in Long Island, N.Y., has had a running dispute with the town of Hempstead for more than 20 years. In the 1940's the town required him, by zoning ordinance, to put up fences around his property and also sought to deny him the right to excavate his deposit. The producer won that case, but later the board amended its order to prohibit excavation of sand and gravel. The state high court upheld that zoning order, knocking out a prior valid non-conforming use principle. That order also required the producer to fill in the hole created by excavation, at an estimated cost of more than \$1 million, and made it a crime with a \$500-a-week penalty every week he didn't do so.

The Supreme Court has accepted this case for review, which is the first time in many years it has taken a case involving application of a zoning law.

Even though this case involves a sand and gravel operator, it is felt to be important to crushed stone producers in that the N.Y. court decision establishes a basis that a quarry is inherently a dangerous operation and that the town was protecting the health, welfare and safety of townspeople. It is important to find out any constitutional limitation on local zoning ordinances. Thus, the NCSA board approved the preparation and filing of a brief with the Supreme Court in this case as a "friend of the court."

Labor legislation on legalization of common situs secondary boycotts seems to have been prevented in this session of Congress. It was reported

that labor itself took wide and divergent views on this proposed bill to an extent that action on it by Congress was delayed.

Earlier in the year, however, the Association did file a statement with the proper Congressional committee that pointed up the group's previously declared policy of opposition to such legislation. Watch for this bill to come up next session.

A guide and handbook that covers the application of federal labor standards laws that affect the industry, being prepared by NCSA counsel, is nearly ready for distribution. This is considered one of the most intricate and complex areas in application of legislation that affects the industry. The new guide will cover 17 federal statutes that establish requirements on labor. The more prominent ones are the Wage & Hour Law, the Walsh-Healy Act, Davis-Bacon Act, and those that cover federally assisted construction such as the Highway Act and the Airport Act. The handbook will be a real contribution to industry, and will provide much assistance to individual producers in the area of application of labor.

Work on research and service testing by NCSA continues to provide benefits to members and the industry. It was reported that, for the past six months, 40 percent of laboratory staff time was devoted to service testing, and the remainder to research. Work of the former type varies in accordance with requirements of members.

Service testing for the period covered was of the type that may be considered evaluation studies, rather than routine testing for compliance with specifications. Such studies, when completed, are believed to be much more useful to members. J. E. Gray, engineering director, reported on results of the more interesting studies that had been made for 18 member companies during the 6-month period.

Research work done by the laboratory staff is applied research, for the most part. But more work is being done in cooperation with state highway departments than ever before, and this type of work is believed to be the ultimate in advancing the position of the crushed stone industry. Details of cooperative studies with five state highway departments were described by Mr. Gray.

Three research projects of particular interest are underway in the NCSA laboratory: concrete durability studies, stone sand in air-entrained concrete, and shape of particle tests on trickling filter media. Studies on the latter show that the

Please turn to page 146



**Concrete products plant reports
on DEISTER Screen operation:**

"EXACT SIZING . . . NOT A PENNY FOR MAINTENANCE"

A well-deserved reputation for quality has made Spickelmier Industries, Inc. of Indianapolis one of the largest manufacturers of concrete products in the Midwest. Now in its 51st year, Spickelmier is able to maintain highest quality standards because it strives to control all factors of production from raw material to finished product. This, according to President Carl F. Spickelmier, is the reason why the company began its own sand and gravel plant operation in 1941.

Aggregate production has expanded steadily over the years, and Spickelmier now supplies outside customers as well as its own manufacturing needs from this plant. During the construction season a stockpile of 40,000 tons is kept on hand.

The full plant load of 150 tons per hour is fed to a three-deck 4' x 14' Type UF horizontal Deister Screen which was purchased in April, 1960.

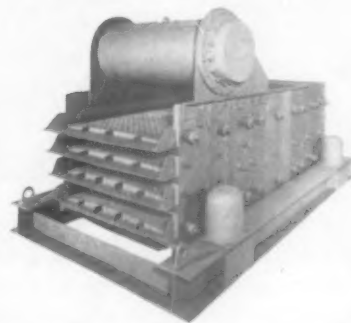
As the material passes across the screen it is sprayed with water at the rate of 400 gpm.

With screen deck openings of 1-1/4", 9/16" and 3/16", the Deister Screen produces four finished aggregate sizes for Spickelmier. In describing this screen's performance, Yard Supervisor Fred Gelzleichter had this to say: "Our specifications call for exact sizing and that's what we get from this Deister. We haven't spent a penny for maintenance since the day it was installed."

Changing screen cloth is a lot faster too, according to Plant Operator Albert Gantz. "We can change the bottom screen on the Deister in about half an hour. On our other screen it takes a whole day to change the bottom screen deck because we must remove the top deck to get to the bottom one. Figure that in terms of production time and you can see why we like the Deister Screen."



Fred Gelzleichter, in charge of gravel plant operations, Spickelmier Industries, Inc.



DEISTER MACHINE CO.
1933 E. Wayne St., Ft. Wayne, Ind.



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*Lone Star Cement solves crushing problems with the products
of four limestone strata at Hudson quarry*

Tough limestones yield to hammermills



One of the two center-feed reversible hammermills which reduces limestone from 6 in. to minus 3-in. fines. Chute at right puts apron dribble into the crusher

Part of the 42-in. belt conveyor system at Hudson. Left-hand conveyor brings new rock into the system; right belt takes crushed limestone to vibrating screens

THE TOUGHEST LIMESTONE—even when it's coated with mud—is no obstacle in Lone Star Cement Corp.'s Hudson, N.Y., crushing plant.

There, twin reversible hammermills operate in parallel behind a giant gyratory crusher to reduce 400 tph. of extra-hard tough Hudson limestones to minus $\frac{3}{4}$ in. Hammermills were selected for the job because they promised the greatest ratio of reduction of all types of crushers—and also because they are seldom bothered by the wet and sticky material encountered during the rugged upstate New York winters.

Four distinct strata on historic Becraft Mountain east of Hudson supply the Lone Star quarry. In descending order they are Oriskany, Port Ewen, Becraft and New Scotland limestones. The Oriskany and New Scotland are high-silica formations (see Table I).

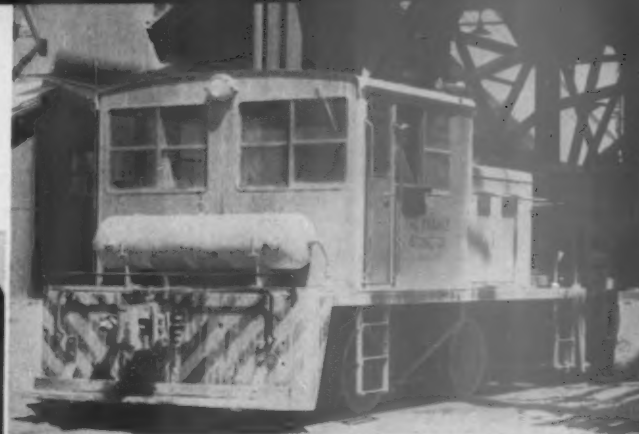
The quarry's shovels are spotted to operate at different preselected locations within the quarry, and a rough production mix is obtained by proportioning the number of loads delivered to the crusher from each shovel. Table I gives the analysis of each formation.

Located near the quarry, the new crushing plant replaces an older installation at the plant proper. Formerly, flat-bed rail cars equipped with side-dump bodies carried rock from Becraft Mountain to the plant. Today six trucks transport the blasted rock the short distance from the quarry face, and overhead belt conveyors deliver the crushed stone from the crushing plant to the rock storage bin nearly $\frac{1}{2}$ -mile away.

Please turn to page 132



The smooth, steady power of this Plymouth Diesel Hydraulic Locomotive assures dependable, capable in-plant haulage at the Indiana quarry of a leading stone company. A total of nine Plymouth Locomotives are in service with this company in their widespread quarry operations.



Plymouth proves its power in rugged quarry hauling

Leading quarry operators everywhere rely on the smooth, dependable power of Plymouth Locomotives for their track haulage, the backbone of quarry production. With peak efficiency, they get the extra bonus of substantial fuel savings and minimum maintenance costs.

See for yourself how Plymouth Diesel Locomotives can improve your material handling operations and

save money. There is a standard model exactly fitted to your operations, weights from 3 to 100 tons with power matched to each size. An outline of your haulage operation is all that's needed for Plymouth engineers to give you a *cost-cutting analysis*.

Contact Plymouth Locomotive Works, Division of The Fate-Root-Heath Co., Dept. A-5, Plymouth, Ohio.

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PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE*

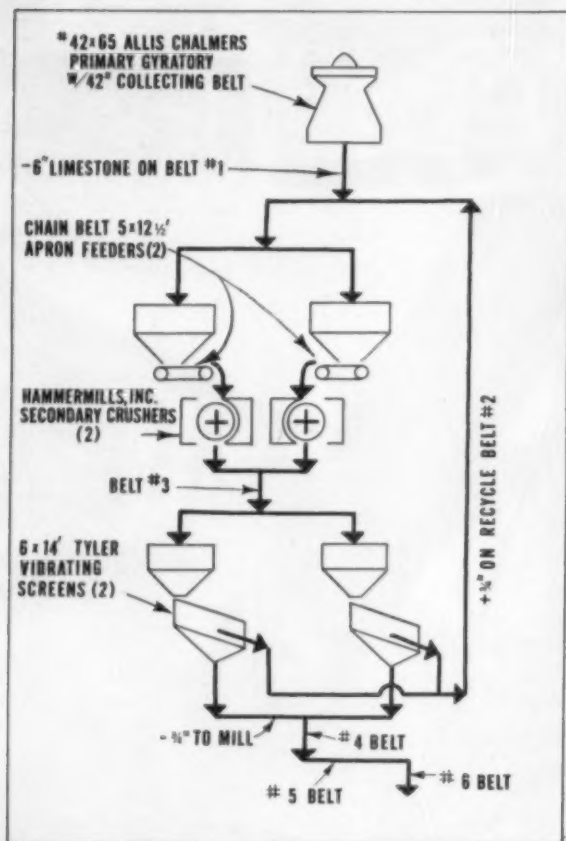
*Torqomotive Drive: Plymouth Transmission coupled to a Hydraulic Torque Converter.



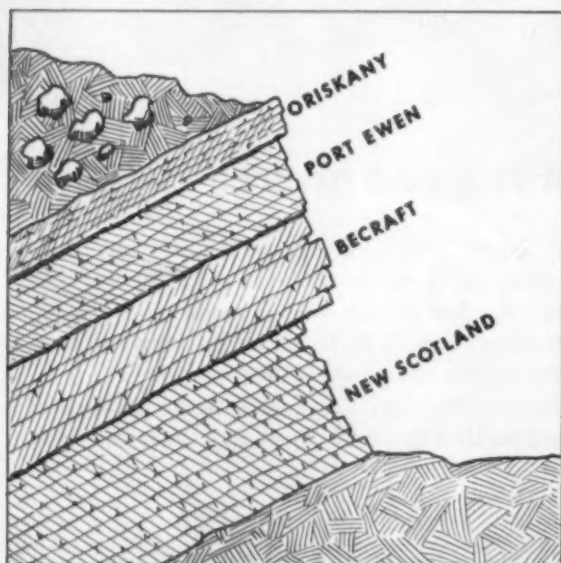
PLYMOUTH
LOCOMOTIVES
in Progressive Industry
throughout the world

Limestones yield to hammermills . . .

continued from page 130



The flow of limestone through Lone Star's crushing system has great flexibility as well as high capacity



This is the way the limestone formations are stacked in historic Becraft Mountain near Hudson, N.Y.

The plant's gyratory hopper is located at ground level, protected by a roof projecting from the crushing plant building that keeps out some of the worst weather. The trucks dump directly into the maw of the primary gyratory, which is equipped with a hydraulic system for raising or lowering the mandrel to adjust its setting. This crusher can take up to 42-in. blocks picked up in a 3½-cu. yd. shovel and rated to make a 6-in. product at about 900 tph. At the Hudson operation, the open-side setting of the gyratory crusher has been standardized at about 6 in.

The minus 6-in. output of the gyratory crusher drops on a 12-ft. long, 42-in. wide horizontal buffer belt, which carries it to the No. 1 rock belt. The buffer belt absorbs the impact caused by the large material falling from the crushing chamber of the primary. Since maximum wear occurs at this point, Lone Star engineers consider the easily replaceable short belt to be most economical.

The No. 1 rock belt, 42 in. wide and 225 ft. long, inclines up the ramp in the crusher building and discharges onto the No. 2 rock belt at a point between the crusher building and the screen house. This new material drops down on the belt which already carries screen oversize. Thus, both the new raw feed from the primary crusher and the circulating load over the screens are delivered together to the secondary crushers.

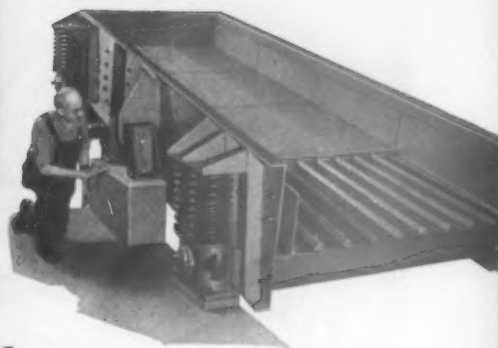
High in the crushing plant the discharge from the No. 2 belt is split into two surge bins, each of which feeds one of two parallel apron feeders. These 5 x 12½-ft. feeders are powered by two 7½-hp. electric motors. They give a uniform feed to the hammermills, and each discharges into one of the secondary hammermills beneath.

Each of the two secondary crushers handles 200 tons of minus 6-in. new feed per hr., plus up to 100 tph. circulating load. These reversible hammermills set in parallel are driven by 600-hp. electric motors, direct-connected to the shafts through a doughnut-type coupling. Each contains fifteen 372-lb. hammers arranged in three rows of five. The reversible feature of the mills increases the life of each hammer between resurfacings. The direction of hammer swing is reversed daily at Hudson so that each hammer's two impact surfaces will wear evenly. Separate hour-meters on the switchgear panels indicate the total hours of operation in each direction.

The hammermills discharge their minus 3-in. output, containing a high percentage of fines, on

Please turn to page 134

BIG SCREEN EXPERIENCE!



Big tonnage units like this heavy duty vibrating feeder solve the toughest screening problems. Built to standards developed through years of experience, these units withstand brutal battering day after day. They work hard, earn more, and last a lot longer. How come?

They're built by the experts!

And Allis-Chalmers builds an ever-improving, complete line of horizontal and inclined vibrating

screens. Famous names like *Low-Head* horizontal, *Aero-Vibe* and *Ripl-Flo* inclined screens cover the full range of applications — scalping, sizing, rinsing, washing, media drain and dewatering.

Ask your A-C representative for help with your screening requirements. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

A-1530

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Limestones yield to hammermills . . .

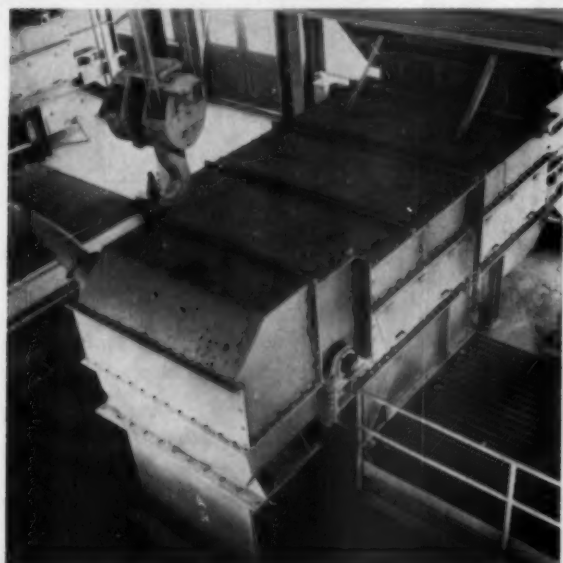
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Table I—These are typical analyses of the different formations at Hudson

Chemical Analysis	1	2		3	
	Becraft	High Iron Becraft	Port Ewen	Oriskany	New Scotland
SiO ₂	2.78	2.16	12.61	35.50	54.20
Al ₂ O ₃	.86	.30	3.11	7.83	8.35
Fe ₂ O ₃	1.46	4.46	.81	3.17	2.03
CaO	52.16	51.30	45.03	26.10	17.10
MgO	.45	.90	.75	2.10	1.22
SO ₃	.08	.09	.06	.07	.04
Loss	41.98	39.90	36.75	23.50	15.46



Rod-deck vibrating screens take out minus ¾-in. mill feed and send oversize back to the secondary crushers



Apron feeders from surge hoppers to hammermills are completely enclosed. Dribble is dropped into the crusher

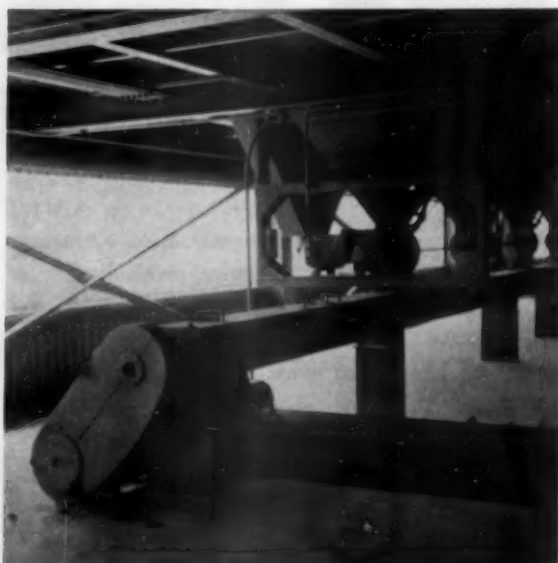
rock belt No. 3. This 42-in. x 227-ft. belt carries the crushed material to the screen house. Here, the material is again divided into two surge bins, each of which feeds one of a pair of 6 x 14-ft. rod deck vibrating screens having ¾-in. openings.

Screen rejects are returned from the screen house on the No. 2 rock belt. As previously described, this circulating load is joined in transit by the minus 6-in. output of the primary crusher and both loads make up the hammermill feed.

Material passing each inclined screen drops to the No. 4 rock belt travelling at approximately 600 fpm., the first of a series of four belts which carry the crushed material to rock storage at the plant. The No. 4 belt is 30 in. wide and 1,313 ft. long. Next in line is a long rock belt, 30 in. wide x 999 ft. long, followed by a 30-in. wide x 137-ft. long belt. The latter belt discharges onto the 36-in. x 363-ft. distribution belt, which is equipped with a motorized tripper in order to give proper distribution of the material within the building.

Interlocked electrical switches automatically shut down the hammermills, their feeders and rock belt No. 3 in case of trouble. The gyratory remains in operation and is halted manually when it has cleared its load. The buffer belt, No. 1 rock belt and No. 2 rock belt also remain in operation to clear the gyratory. They feed rock from the

Please turn to page 148



Dust is a prime product that is carefully collected above hammermills and returned to belt conveyor system

How to Simplify PIPELINE Installation



Depend on **NAYLOR** Pipe and Wedgelock Couplings

If the job calls for air, water, tailings or ventilating lines, you'll save time and money with NAYLOR Spiralweld pipe and easy-to-use NAYLOR Wedgelock couplings.

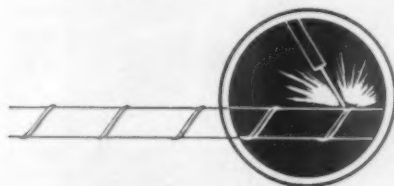
This combination is the simple answer to pipe line construction. NAYLOR pipe is easier to handle, easier to install. Although it's light in weight, you'll find there's no sacrifice of strength—thanks to the exclusive lockseamed-spiralwelded structure which creates a stronger, safer pipe.



NAYLOR Wedgelock couplings make a positive connection, securely anchored in standard weight grooved ends.

The Wedgelock coupling saves time and work, too. It speeds connections. Joints can be made up with only one side of the pipe in the open. A hammer is the only tool needed to connect or disconnect it.

For details, write for Bulletin No. 59



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ROCK PRODUCTS, September, 1961

135

Noxious sulphite waste liquor thins heavy slurries, boosts grinding mill efficiency

Cement mill profits from paper mill waste

by Eitaro Ushiro* & Tsuyoshi Yanot†

A CHALLENGE TO MODERN INDUSTRY is the use of harmful industrial by-products which create social problems. The disposal of sulfite waste liquor from the pulp and paper industry is one of these problems. Following three years' study, the Cement Div. of Toyo Soda Manufacturing Co. at Tonda, Japan, has adopted the idea of using sulfite waste liquor (SWL) to reduce the water content of raw slurry and to reduce its viscosity. This not only eliminates a troublesome disposal problem, it also cuts down considerably in the fuel cost of cement making by reducing water content of the raw slurry.

Adding SWL has brought about a reduction in the water content of our raw slurry by about 3.7

percent. The output of each of the raw mills was increased by 2.26 tph., and the average electric power requirement of each mill was reduced about 2.33 kwh. per ton.

In the wet-process plant, the degree of water content in the raw slurry has, needless to mention, a very important bearing upon the cement-making processes, including pulverization of the raw material, agitation, mixing, storing, transporting and firing. It is particularly true in Japan where fuel is expensive and the amount of water in the slurry is the prime factor in determining production cost.

A pulp plant some 50 miles away had been dumping their waste liquor into the sea, causing considerable trouble with the fishing industry. About 50 percent of the wood used in pulp making goes into the finished products and the rest stays

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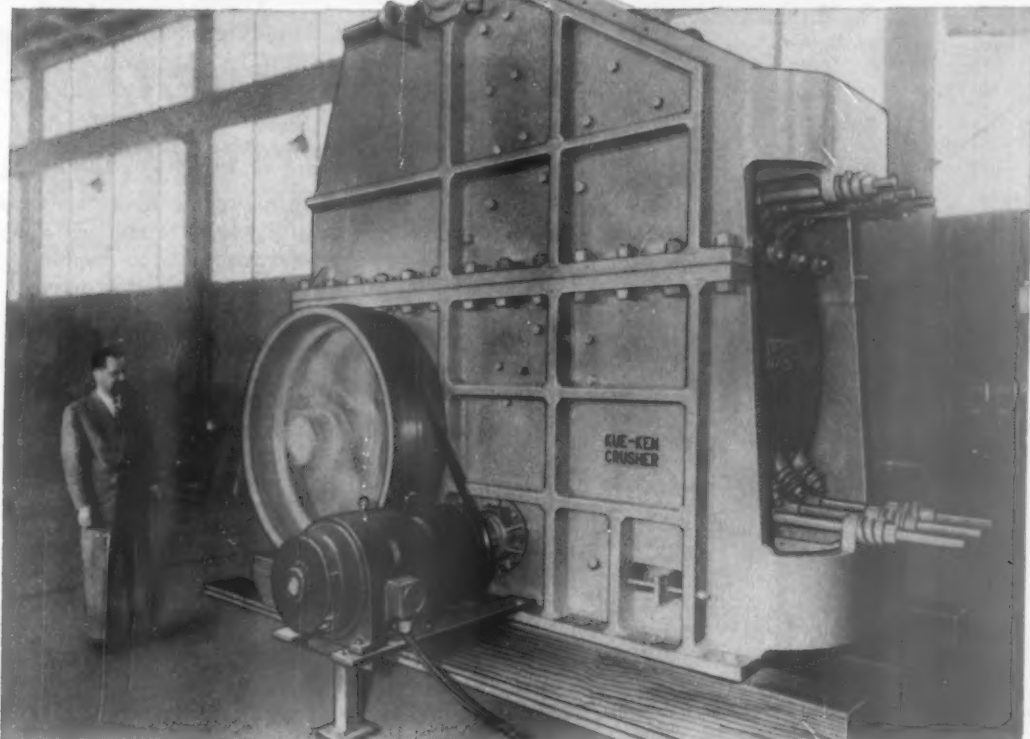
*Director and Chief of the 3rd Production Div., Toyo Soda Mfg. Co., Tonda, Japan

†Staff member of the Research Div., Toyo Soda Mfg. Co.

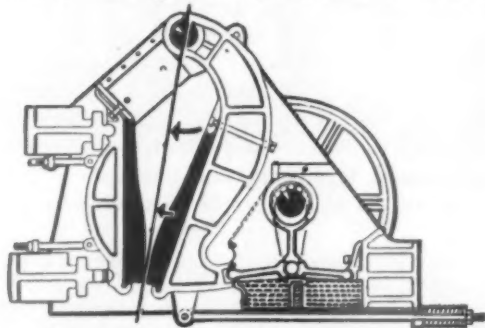
THE CEMENT PLANT of Toyo Soda Mfg. Co., Ltd., at Tonda, is on deep water where it can receive bulk shipments of sulphite waste liquor



KUE-KEN® uses power to crush rock . . . not to wear out jaw plates!



Kue-Ken "crushing without rubbing" eliminates the major cause of power loss in conventional crushers. Kue-Ken produces greater output of crushed rock for power consumed than any other crusher. The Kue-Ken pendulum type swing jaw crushes rock squarely without the usual upward-downward rubbing action that wastes power and wears out jaw plates. It also eliminates power loss inevitable with crushers that must lift heavy, unbalanced jaws. Kue-Ken swing jaw, driven by toggles that multiply leverage 3 to 1, has maximum leverage at top where large rocks are crushed with less power. In shop test, the 48" x 42" Kue-Ken, above, is started by a 30 hp motor with a single vee belt and runs mounted on skids not fastened to the floor at the operating speed of 275 rpm on only 17 hp!



Kue-Ken "crushing without rubbing" saves power and lengthens jaw plate life at least 5 times! The pendulum type jaw supported on a stationary hinge pin in center line of the crushing zone swings in an almost straight line to crush rocks squarely without rubbing.

Additional power savings are engineered into every section of the Kue-Ken design. A precision machined toggle mechanism operates in a sealed, filtered oil bath to reduce wear and friction to the absolute minimum. Power that is wasted in non-sealed, dirt-catching mechanisms is fully utilized by Kue-Ken in crushing rock.

Kue-Ken operates with a single lightweight flywheel that is easily started with a normal duty squirrel cage motor. An automatic, adjustable safety release integral with the flywheel ends shearing or breaking parts caused by tramp iron. In 33 sizes from 12" x 7" to 48" x 48", Kue-Ken Crusher crushes more rock with less power for lowest cost-per-ton crushing.

KUE-KEN® CRUSHERS

"CRUSHING without rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

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Cement mill profits

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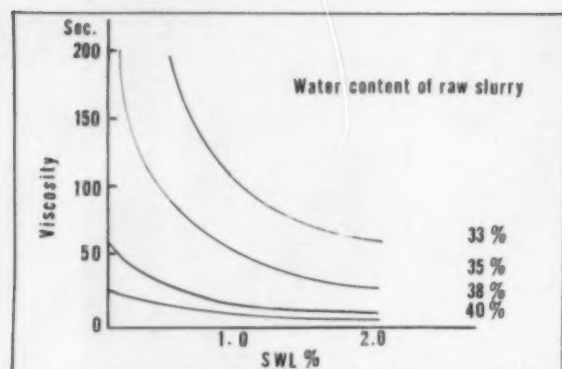


FIG. 1—Sulphite waste liquor yields a drastic reduction in viscosity of slurries between 33 and 40 percent water

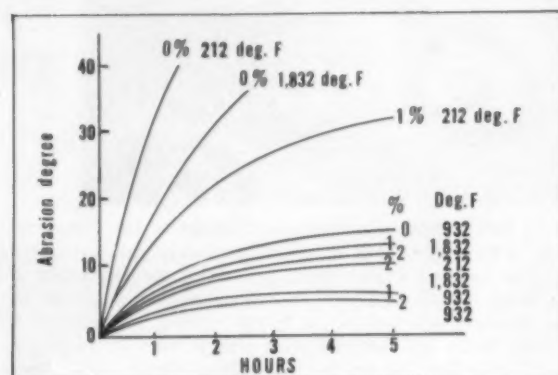


FIG. 2—The use of SWL improves the strength of clinker

Experiment period		Without SWL			While SWL being in use						Without SWL	
Day		1	2	3	4	5	6	7	8	9	10	11
Raw slurry	Water content %	37	35									
	Electric power requirement per mill kwh./t.	29	27									
	Viscosity (sec.)	80	76									
Mixed slurry	Water content %	39	37									
		37	35									
Long kiln clinker	Weight by volume (kg./l.)	1.38	1.37									
		1.37	1.36									
	Kiln output (t./day)	688	646									
	Heat required (kcal./clinker-t.)	155	150									

FIG. 3—Sulphite waste liquor has a powerful influence on viscosity, density and water content of heavy slurries

in the waste liquor, either dissolved or in the form of organic colloid. The thickness of the waste liquor is usually between 120 to 130 grams per liter, or about 1 lb. per gal. of water.

Strongly acid, this waste liquor is highly harmful to living things. A few plants in Japan extract alcohol from it in a process which only partially neutralizes its acidity while removing about two-thirds of its sugar content. It remains just as harmful to living things as the original waste liquor. We are gratified that this product of little value can be made to serve the cement industry by reducing production costs.

Toyo Soda uses the waste liquor produced by the Iwakuni plant of Sanyo Pulp Co., from which alcohol has been extracted at an alcohol fermentation plant. This de-alcoholized waste liquor is discharged from the tank boat into our off-shore storage tanks and conducted to the plant by pipes as shown in the diagram. It is drawn into the storage tanks from the boat by pipes under air pressure and supplied to the head tanks by pumps as the supply in the tanks decreases. The liquor in the head tanks is measured by flow meters and then added to each raw mill.

The use of SWL was the result of experiments in an effort to reduce water in the raw slurry. Any reduction of water in the raw slurry naturally increases its viscosity, making it difficult to manage in the ensuing processes. So we experimented with several additives that lower viscosity to determine their effectiveness and cost. These experiments convinced us to use SWL because of its effectiveness, economy, as well as technical considerations. The use of SWL was actually started March 10, 1959, and results have been satisfactory.

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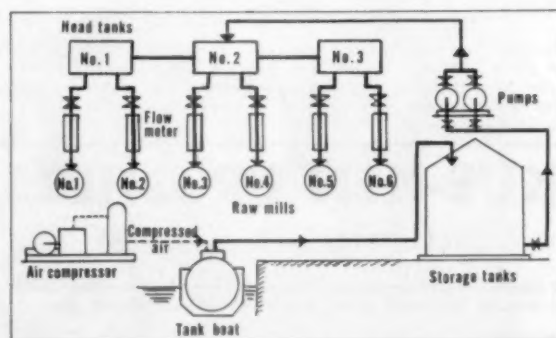


FIG. 4—Here's the way sulphite waste liquor is handled from boat to raw mills

**"Put SECO to work
on your toughest
screening job!"**

Says Mr. GUY COOLIDGE
Superintendent, Putnam-Hawley
Building Materials, Inc., Potsdam, N. Y.



"We did, and we are not only sold on the increased production results, but with the low maintenance factor as well.

Our graded production runs a full 170 T.P.H. in five rigid classifications; three finished gravel grades plus mason and concrete sand . . . And on all five, we're meeting specs of the New York State Highway Department.

Even the wire cloth lasts longer . . . we've had fewer changes than ever before. But when re-

placement is necessary, downtime is at a new low with SECO's fast-securing method."

Mr. Coolidge's enthusiasm is shared by hundreds of other profit-wise aggregate producers from coast to coast. They are sold on the SECO TWIN-BEARING screen's year round productivity potential and day-in, day-out operating dependability.

You will be, too. Make your next vibrating screen investment a profitable one . . . make it SECO TWIN BEARING.

REQUEST SECO BOOKLET TB-21

SCREEN EQUIPMENT CO. Inc.
BUFFALO 25, NEW YORK



Cement mill profits

continued from page 138

This is how the experiments were conducted: The effectiveness of each of the additives was studied in the laboratory, by measuring water content in the raw slurry, varying the rates of additives used and studying the changes in the viscosity. For the viscosity measurement, a Bingham viscosity meter (with some changes made by our-

TABLE 1—Rate of additives used and resultant viscosity of slurry

Additive	Amount used (percent)	Viscosity (sec.)
SWL (3)	1.5	80
San Flow (4)	0.3	80
Telnite-B (5)	0.2	65
Tripolyphosphate soda (6)	0.2	75

(1) Standard raw slurry used for the experiments had 33 percent water, 80 sec. viscosity at temperature of 68 deg. F.

(2) The rate of the additives added represents the ratio to the dry weight of the raw materials.

(3) SWL from Iwakuni Plant, Sanyo Pulp Co., has solid acid of 120 g/l.

(4) San Flow is SWL condensed to 1/2 with solid 600 g/l from Iwakuni Plant, Sanyo Pulp Co.

(5) Telnite-B is manufactured by Teikoku Sekiyu Co.

(6) Tripolyphosphate soda is manufactured by Nissan Kagaku Company

TABLE 2—Quantity and cost of additives

Additive	Additive quantity per ton dry raw material (Kg.)	Additive cost per kg. (Cents)	Additive cost per ton dry raw material (Cents)	Additive cost per ton of cement (Cents)
SWL	15.0	0.2	2.5	3.9
San Flow	3.0	1.7	5.1	8.0
Telnite-B	2.0	36.1	72.2	114.2
Tripolyphosphate soda	2.0	36.1	72.2	114.2

The quantity of dry raw material required to make 1 ton of cement is here computed to be 1.58 tons

selves to meet our requirements) was used. The time required for a fixed quantity of raw slurry to flow out is taken as the degree of viscosity.

Table 1 shows the rate of additives used and the resultant viscosity of the raw slurry which had 33 percent water and viscosity below 80 sec. Only four of several additives tested are included here.

Table 2 shows quantities of additives used and the cost of each. The additives Telnite-B and tripolyphosphate soda cost 29 times more than SWL, making both of them impractical for use. San Flow costs twice as much as SWL—this represents the cost of condensing. Moreover, San Flow has another handicap: it has to be diluted for measuring.

Adding SWL accomplishes a reduction of the water content in the raw slurry without increasing its viscosity. The relations between the water content in the raw slurry and the viscosity when SWL is used are shown in Fig. 1.

Experiments were then moved from the laboratory into the plant for further studies on effectiveness and to find the best method for adding SWL. Only two of the raw slurry mills were used in these experiments because of a limited quantity of the viscosity reducing additive used. Fig. 3 shows the results of these experiments.

For precaution, the quantity of SWL added was fixed at 1.5 percent to a raw slurry with 33 percent water. Although the raw mills to which SWL were added were limited to two, we were able to confirm the following facts:

● By adding 1.5 percent SWL to raw slurry, the water content of the slurry was reduced by 2 percent and the viscosity was found to be below 80

Please turn to page 142

TABLE 3—Comparative data on the use of SWL

Experiment period	Raw slurry water content (percent)	Output of raw mill (tph.)	Electric power required (kwh./t.)	Mixed slurry water content (percent)	Long kiln output clinker (tph.)	Heat required by long kiln (kcal./c.t.)
Before SWL used	1958					
	Oct.	37.0	22.91	26.86	37.1	25.21
	Nov.	36.6	23.67	26.05	37.6	25.40
	Dec.	37.0	22.06	27.65	37.7	25.38
	1959					
	Jan.	36.2	21.81	27.41	37.4	26.58
After SWL used	Feb.	36.6	23.29	25.87	37.4	24.89
	Mean	36.7	22.75	26.77	37.4	25.49
	1959					
	Apr.	33.3	24.48	24.79	33.7	27.97
	May	32.9	23.82	25.30	33.5	26.60
	June	32.7	24.94	24.13	33.2	26.51
Difference	July	32.8	25.47	23.97	34.0	26.95
	Aug.	33.1	26.34	23.87	33.6	26.60
	Mean	33.0	25.01	24.40	33.6	26.93
		-3.7	-2.26	-2.33	-3.8	-1.44
						-127,800



WHY IT COSTS LESS TO OWN A CAT GRADER

Most motor graders *look* pretty much alike, no matter who makes them. They handle similar jobs, too, and it isn't always easy to *see* any big difference in the way they handle them. In fact, the manufacturer's suggested prices usually are not greatly different for machines of nearly equal specifications—regardless of the “deal” that may be offered a buyer. But *used* motor graders vary considerably in price. Why?

The Buyer Determines Price

A used machine is priced at what the buyer is willing to pay . . . it's a measure of what *he* thinks is left in a machine. So, with used equipment, the buyer sets the price. This is clearly demonstrated at used equipment auctions. A check of auction prices throughout the country shows, for example, that the Cat No. 12 Motor Grader brings substantially higher prices than comparable machines of other makes—as much as 80% more. (Only machines of the same age, same condition and with similar attachments were compared.) What makes a Cat Motor Grader more desirable than other makes?

A Feature That Affects Cost

Any machine is desirable if it is known to be dependable. This reputation can

only be the result of true quality design and quality construction. The Cat oil clutch is a good example. It was designed and is built to give long, trouble-free life. But, how well does it do it? Let's examine the records of just one Caterpillar Dealer who has 161 oil clutch-equipped motor graders in his territory. His records show that in four years he has sold only \$24.38 worth of parts for motor grader oil clutches! One machine in his territory went 2524 service meter hours without any work on the clutch. Many users report 2000 hours of service before the first adjustment. In 1000 hours of operation only about .0025 inch of wear can be expected—less than the thickness of a human hair. And, since all parts are constantly bathed in oil there is no need for lubrication maintenance. Less wear, less attention mean not only lower total repair costs but more time on the job . . . less down time. Of course, the oil clutch is just one example of many quality features in Cat Graders.

A Look at Total Cost Records

The cost records of private owners and governmental bodies show which machines cost less. For example, an Indiana county keeps individual cost records on their six motor graders, 14 trucks, three loaders and five tractors.

Their records showed that a year-old No. 12 needed only a set of head gaskets and two spark plugs with \$25 labor, while two newer graders of another make needed major engine repairs, new clutches and side shift linkage. One town in New Hampshire reports that in over 20,000 hours, their No. 12 has never had a breakdown that held up work more than three hours. Operating costs—24¢ per hour exclusive of fuel, oil and operator. Comparing a Cat No. 12 to another make (after 3½ years' service), the records of an Arkansas county showed a saving of \$2478.57 in parts and labor for their No. 12.

What's in It for You

Others have proved that Cat Motor Graders cost less in the long run because they are built better in the beginning. Your Caterpillar Dealer has additional facts and figures on low-cost operation of Cat Graders in your area. Ask him for free Cost Record Books so that you can keep individual machine records on your equipment. Prove to yourself that it costs less to own a Cat Grader.

Caterpillar Tractor Co.,
General Offices, Peoria, Ill., U. S. A.

CATERPILLAR

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Cement mill profits

continued from page 140

sec. The raw slurry here includes that of raw mills to which SWL had not been added.

- Electric power consumption of the raw slurry mill was reduced by 5 percent.

- The water content in the raw slurry entering the kiln was reduced by about 2 percent, while the long kiln output increased by about 15 tpd.

- No changes or abnormalities in the quality of clinker in which SWL was added were observed.

We decided to embark on plant-wide use of SWL through the system shown in Fig. 4.

We add about 1.5 percent of SWL to dry weight of raw material at a constant rate. In semi-wet-process kilns the raw slurry is dehydrated by filters and goes into the rotary kilns in the form of cakes. Some SWL is found in the filtrate and is recovered for use again as an economy measure. Table 3 shows the results of the use of SWL over a 5-month period compared with the showing of a similar period during which SWL was not in use.

No marked differences brought about by the use of SWL in the semi-wet-process kilns were noticed because the raw slurry is subjected to a dehydrating process. Also, no definite data were obtain-

able on the amount of flying dust within the kiln. But there have been no adverse effects on the quality of semi-finished and finished products.

As an afterthought, we had another consideration: Were the nodules formed within the kiln strengthened by the use of SWL? So we made studies of the degree of abrasion of the nodules under varying quantities of SWL and calcination conditions. The results are shown in Fig. 2.

The strength of nodules is greater when SWL is added, under the same calcination conditions. The degree of hardness increases as the quantity of SWL increases. As to the calcination conditions, the temperature at 932 deg. F. achieves the maximum hardness of nodules in each of the varying quantities of SWL added. And it becomes smaller at 1,832 and 212 deg. F. It was observed that abrasion of nodules is greatest at the temperatures of 212 and 1,832 deg. when SWL is not added and at 212 deg. when 1 percent of SWL is added.

Accordingly, by adding SWL it is apparent that the hardness of the nodules within the kiln can be strengthened and the amount of dust in the kiln can be minimized.

END

Rocky's Notes

continued from page 24

when the element silicon could react as such. There are silicides, or compounds of silicon and a metal element, which are formed at temperatures much less than those in a cement kiln.

For example, it would appear that silicides of the alkali metals—such as sodium or potassium—could be formed in cement kilns, as well as silicides of calcium and magnesium, if reducing conditions happened to obtain. Such conditions are possible, temporarily at least, in certain parts of a kiln, or under certain conditions, and yet not be evident in an analysis of the exit gases. Or silicides could be formed in the presence of such catalyst elements as chlorine, sulphur, fluorine, iron, aluminum, etc., which are always present in varying even if in small amounts in either the raw materials or fuel. In other words, we know too little about the actual calcination process, simple as it is generally accepted to be.

Turning now to the one silicon system with which we are more or less familiar, Si - O, there is a variety in SiO₂ structures, and it is not safe to assume that they all react in the same way. It has long been known, of course, that the silica

already in combination with calcium and/or aluminum in some instances makes possible the manufacture of portland cement much more readily than the silica ingredient as quartz. We really do not know why, except that the more finely divided is the silica, the more reactive it is; or the better distributed it is in the raw material, the simpler the kiln reaction. However, there must be more to it than that.

Our author, for example, states that "with prolonged heating above 867 deg. C., in the presence of mineralizers, quartz is converted into tridymite and above 1,027 deg. in the absence of mineralizers into cristobalite." The author adds that the structure and properties of quartz are not as simple and unequivocal as normally seems to be the case. The structure changes, the angles of the bonds change, and even the character of the bonds change. Since the manufacture of cement clinker undoubtedly causes breaking and rearrangement of such bonds, it would seem essential to study silicon in all its phases. For example, our author states that quartz is least active and tridymite most active.

Please turn to page 145

EXTRA



UNIVERSAL SCREENMASTER FLOATS ON AIR AND RUBBER, PROVIDING SHARP, CONTROLLED-SCREENING ACTION FOR EXTRA PRODUCTION

Nothing is quicker or snappier than the air springs of a Universal Horizontal Screenmaster.

Metal fatigue in conventional leaf and coil springs causes sluggish, inefficient screening.

Universal air springs retain their smooth aggressiveness indefinitely, assuring efficient screening action.

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cradle the basket and maintain positive control of its action. All parts work smoothly together without the destructive corner to corner violence of conventional screens using old fashioned sluggish leaf and coil springs.

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This unique combination of phasing bars and air springs assures a consistent high level of performance, resulting in *extra* production in all types of material.

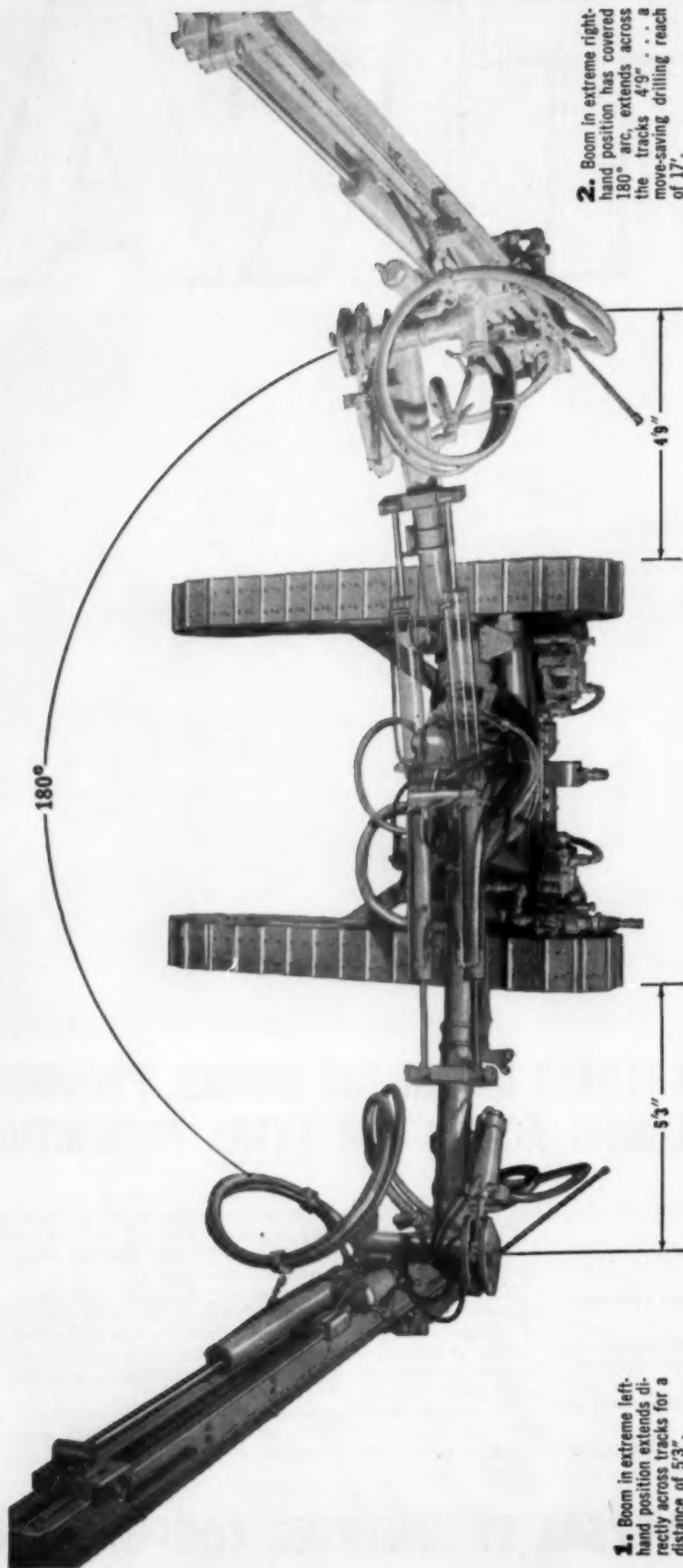
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TRACDRIL'S 180° "BOARDING HOUSE REACH" PAYS-OFF!

More and more mining men are discovering that with the full 180° ground coverage of the G-900 Tracdril fewer moves are needed . . . that more blast holes can be drilled from every set-up.

In addition to the time-saving advantages of their 180° "Boarding House Reach", new G-900 Tracdrils have already gained an outstanding reputation for:

- Extra-long crawlers, 1350 sq. in. ground contact and knee-action . . . that take bad footing in stride.

- Remarkable ability to shift from straight verticals . . . to high horizontals, 11 feet at the face . . . or to snake holes at ground level.

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Rocky's Notes

continued from page 142

Since the most activity would be desirable for cement manufacture, how does one go about converting quartz to tridymite either in the raw material or in the calcining process? The author says the scheme of conversions of SiO_2 which he presents is very complicated because complete experimental data are still lacking. In other words, in spite of all the research and the vast literature on so, apparently, simple a material as silica, much remains to be known before the conversion phases can be accurately charted.

He concludes, "It can be stated truly that the further study of silica, which is of exceptional interest in all respects, will be of even greater benefit to mankind." The "all respects" that the author refers to are its use in glass manufacture and for many structural materials and refractories. That is the nearest he comes to mentioning cements.

One can readily understand that cements can differ, not only from mill to mill, but on different days from the same mill, even though the proportions of raw materials may be controlled with the greatest accuracy. Silicon is one of the most reactive elements in nature; it forms bonds of different kinds and different strengths. It forms bonds under special conditions with many other elements than oxygen. There is a vast and growing literature on it. The question is what use can be made of this new knowledge in the manufacture of cement and concrete? Surely the peculiarities of such a powerful element must have some bearing on its reactions in the temperatures and conditions existing in a rotary kiln. And the kiln product thus made would react differently with water.

END

You can jump profits . . .

continued from page 90

lem arose. Lack of liaison, in fact, was listed as a problem in the survey returns.

Here are the five biggest problems that producers say are plaguing them and their maintenance programs today, in order of importance:

- ▶ 1—Abuse of equipment.
- ▶ 2—High maintenance costs.
- ▶ 3—Training of maintenance personnel.
- ▶ 4—"Other" problems (not listed). They include overloading, lost time picking up parts and completing repairs, maintaining obsolete equipment, and others.

Please turn page

ACME SCREENS ARE MADE STRONGER TO LAST LONGER



Sand and gravel producers! Rock plant owners! Acme wire screens are woven from the finest materials available to resist abrasion and wear . . . important to you because Acme screens last longer . . . cut screen replacement costs and increase profits.

Acme screens are precisely crimped for weaving into exact spacing. No irregular openings to slow the flow of material.

Acme wire screens are available in Arch, Smoothtop and Double crimp. Perforated plate screens are also available.



Acme Smoothtop screens are recommended when smooth surfaces are required. Longer service is provided with Acme Smoothtop screens due to less friction caused by material passing over the screen.

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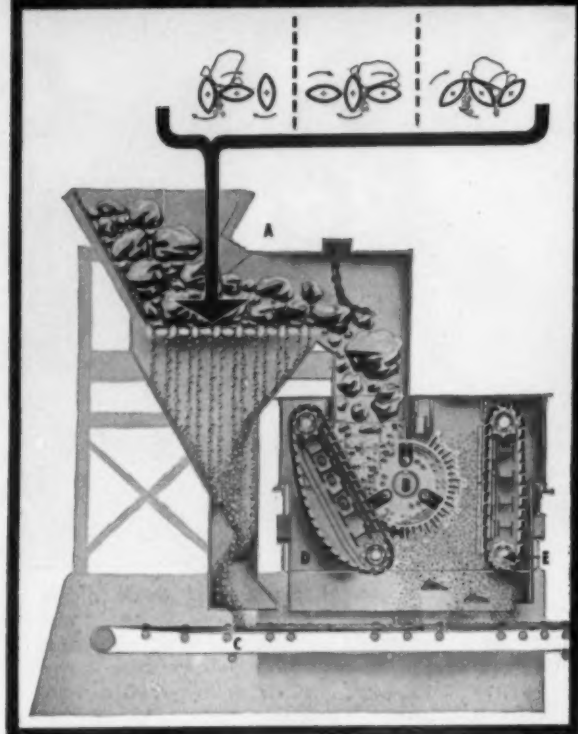
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The Wobbler Feeder (A) feeds the Bulldog Hammermill (B). Its tumbling, rocking motion sifts fines and clay through the bars to under conveyor (C). Only clean oversize rock is delivered to the Hammermill. The Wobbler Feeder scalps as it feeds without blinding or plugging, particularly valuable when wet, sticky material is a problem. Bulldog Hammermill's traveling breaker plate (D) and cleaning bar (E) eliminate build-up of sticky material in

breaking chamber. Your crushing operation keeps going without clogging or jamming regardless of moisture present.

Since the Wobbler Feeder sends only oversize to the Bulldog Hammermill, the Bulldog can handle more material per day. Add this efficient, no-waste breaking power to the double, non-clog protection of this new combination and you can increase your production up to as much as 100%!

For the name of the Hammermill representative nearest you, write:

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You can jump profits . . .

continued from page 145

► 5—Keeping good maintenance personnel.

Perhaps the best summary of the "maintenance headache" question was given by a producer who wrote: "Getting a personal relationship established between men and machines. The other items [10 listed] are only of secondary significance." Proper training of all personnel involved would go a long way toward establishing such a relationship.

In summary, the aggregates industry reports that all but its smaller plants are actively doing something about reducing operating costs via good maintenance programs. Future improvement can be made through putting a greater accent on proper attitude toward programs all through the organization, better records and cost analysis, and on complete and continuous training. Finally, coordination of effort among all company departments, to reach specified maintenance goals, with good liaison and communications between them, will assure success of your maintenance program.

END

NCSA Meeting Report . . .

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federal specifications are much too restrictive, which has caused many producers to pass up this type of business. It is planned to submit test data to the proper government agency with a request that they revise specifications to a more practical definition limit.

Other business conducted by the board at its July meeting included: (1) process with the establishment of a group insurance plan for association members; (2) re-naming J. R. Boyd as executive director of NCSA for 1962 and each year thereafter through 1964; (3) naming G. A. Austin, Consolidated Quarries Div., Georgia Marble Co., an honorary director in recognition of his valuable contributions to NCSA in the past; and (4) further finalizing plans for the 1962 NCSA annual convention and exhibition, which will be held in Chicago, Illinois, February 12-14, 1962, at the Conrad Hilton Hotel.

The next midyear meeting of the board will be held at Grove Park Inn, Asheville, N.C., if final arrangements can be completed. An alternate meeting place is the Homestead, Hot Springs, Va., July 11-13, 1962.

END

STUDY PROVES EXTRA PROFITS OF HOPPER TRAILER HAULING

- Legal Payloads Up
- Traction Maintained
- Fines Eliminated
- Dumping Accelerated

**45% MORE REVENUE
FOR NEW YORK CONTRACTOR**

A recent on-the-job study was made in New York State to compare the actual hauling performance of a tandem rear dump truck and a Gar Wood hopper trailer, both owned by the same contractor. The job involved hauling gravel for road construction.

The figures in this job study reveal the tremendous additional yearly revenue possible with the hopper hauling method (see chart).



GAR WOOD MAKES A WIDE RANGE of open and closed hoppers in both train and semi-trailer models, with a complete line of discharge gates. Gar Wood has engineered models to deliver the biggest payloads under all operating conditions, still meeting axle-loading laws in all states. Example: The Gar Wood "Easterner" (illustrated) combines powerful tandem-drive traction with far greater legal payloads. This unique combination produces extra hauling revenue for both on- and off-highway work.

"HOW CAN I OPERATE LEGALLY AND STILL MAKE A PROFIT?"

This is a problem more and more hauling contractors are facing. In many sections of the country tractive power is a must for off-highway construction hauling. Yet equipment with ample traction can be short on payload capacity if legal requirements are met. Overloading tandem-axle rear dumps increases payloads, but overload fines leave a slim profit.

To meet these and other regional requirements, Gar Wood hopper trailers are specifically designed to deliver the biggest legal payloads under particular state laws. On the job study shown, this Gar Wood hopper earned 45% more revenue and overload fines were completely eliminated.

ASK US TO STUDY YOUR OPERATION

Gar Wood will make a Free Payload Analysis of your operation, just like the one shown above. Regardless of your hauling job, Gar Wood will show you how hopper trailers can be used to produce extra revenue. See your local Gar Wood distributor, phone Trailer Sales Department, or mail the coupon.

	HOPPER TRAILER	REAR DUMP TRUCK
Legal Yards Per Trip	15	10½
Miles Per Trip (One-way, Loaded)	7	7
Yard Miles Per Trip	105	73.5
Hauling Revenue Per Yard Mile	12.4¢	12.4¢
Revenue Per Trip — Per Unit	\$13.20	\$9.11
Trips Per Day	12	12
Revenue Per Day	\$158.40	\$109.32
EXTRA Revenue Per Day	\$ 49.08	
Working Days Per Year	120	
EXTRA REVENUE PER YEAR PER UNIT	\$5889.60	

Think what 45% more revenue, practically all pure profit, could mean on your own job!

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This is an ingenious device, if we do say so, that can be fitted to any Merrick Weightometer, no matter what its vintage. It produces a straight-line voltage output control signal. You can use this to control or provide information in a whole host of different applications. With it, you can relate other process steps to your conveyor feed. Or you can couple your Weightometer to a continuous recorder, or make it feed information into a computer.

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Limestones yield to hammermills ...

continued from page 134

primary crusher to the surge bins above the secondary hammermills, where it is held until the trouble is uncovered and eliminated.

It takes only two men to operate the crushing plant and conveyor system—namely, a crusher operator and one man at the end of the half-mile belt system between the screen house and the distribution belt. Other quarry personnel maintain the crusher buildings and equipment. The plant normally operates on a 40-hr. week.

A minimum of dust is ensured by bag collectors serving the crushing house and the screen house. Fines accumulated by the dust collectors are fed to the output conveyor system by screw conveyors.

When visual inspection indicates that hammers have worn as much as 1 in., the mill containing these hammers is shut down, the hammers pulled and a spare set installed. Removing the hammers and installing spares is normally accomplished in one working shift, and during this time the other plant easily carries a load equal to 75 percent capacity. It takes 30 to 40 lb. of weld metal to resurface both faces of a single hammer.

A maximum hammer life of 900 hr., or 180,000 tons, has been attained at Hudson; the minimum is approximately 300 hr., or 60,000 tons (both figures discounting circulating load). This rather extreme fluctuation is probably due to the variation in hardness and silica content of rock quarried at different times. Under normal conditions, with each mill handling one-half the load, actual power consumption averages about 40 amp. per mill at 4,160 volts.

Maintenance operations are facilitated by a 35-ton bridge crane with 20-ft. span mounted on racks running 50 ft. immediately over the hammermills. The crane rails also extend beyond the building proper over the outdoor primary crusher installation, so that the crane may be used in servicing the gyratory.

END

MAJOR EQUIPMENT REFERENCE

Trucks, end-dump, 15-ton (4)	} Mack Trucks, Inc.
Trucks, side-dump, 20-ton (2)	
Gyratory crusher, No. 42-65	Allis-Chalmers Mfg. Co.
Secondary hammermill, HMIR-06-CF (2)	Hammermills, Inc.
Apron feeders, 5 x 12½-ft. (2)	Chain Belt Co.
Vibrating screen, 6 x 14-ft., F-800, (2)	The W. S. Tyler Co.
Overhead crane, 35-ton	P & H Harnischfeger Corp.
Conveyor idlers	Chain Belt Co.
Conveyor belts, 3,142-ft.	Lee Rubber & Tire Co.
Dust collectors (2 systems)	The W. W. Sly Mfg. Co.
Screw conveyor system	Link-Belt Co.

NEW LIPPMANN IMPACT CRUSHERS

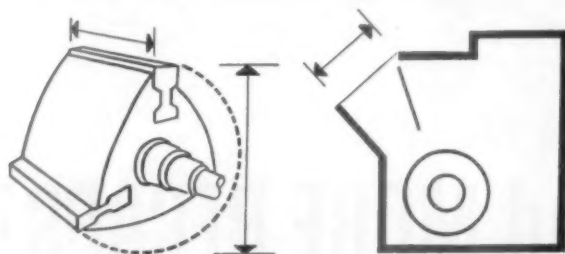
*Now, get more efficient
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increase production. Here's why:*

Fewer Fines — The greatly reduced telltale cloud of dust offers convincing proof that Lippmann impactors, even when run at top capacity, instantaneously, cleanly fracture rock. 70-85% passes 1½" square screen openings, 33-38% passes ¾" square screen openings, with only 12-15% passing 6 mesh.

Faster, complete breaking — Lippmann impactors' new highly-efficient chamber configuration enables the massive rotor and hammers to fracture the rock on impact and hurl it directly at the adjustable curved grate. You use less horsepower... greatly reduce hammer wear.

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Lippmann rotor ratings give you a true picture of impactor's ability.

Feed opening ratings alone have little or no meaning.

Both Lippmann single and double rotor impactors are available with 40" or 45" hammer swing and 36" or 48" width. Other sizes available on special order.

Watch the finished product streaming from a Lippmann impactor. It's clean, cubical, with a minimum of flats and elongated pieces. Additional questions? Talk to the owners or your Lippmann representative and get the full story.

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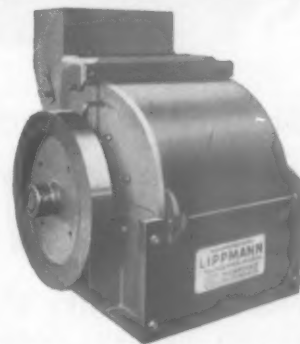
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TRUCK TALK

by Chet Cunningham

Wish you could run your rock products trucks 100,000 miles without an oil change? It's being done by the city of San Fernando, Calif. They have a police car with "over 100,000 miles" on it. The oil has never been changed and the valve covers never removed.

The answer is the oil filters. They believe that the use of the right oil filter can appreciably reduce engine wear.

At San Fernando, they use Fullers Earth filters on all city equipment. They take oil samples for chemical oil analysis on all rigs. Each succeeding evaluation showed less ash content, less precipitants and fewer Kissling resins.

These filters even pick up resin deposits that were left in the engine previously and are now being flushed out. Since the acids, gums, varnish and solids can be effectively removed by the Fullers Earth filter, it was decided that a detergent oil was not needed.

After trial and error, a straight mineral oil with an inhibitor and a pour depresser added was put into all new equipment and never changed. They use 4 x 6-in. Fullers Earth filters and change them every 2,000 miles.

Ash content has dropped to .03 percent, only a trace of precipitates and no water or Kissling resins are found on most analyses. Spark plug life has tripled to 30,000 miles even, on the low-speed idling-type police rigs. The same procedure on filters is used on all heavy rigs too, such as dumps, loader-packers, jeeps, tractors.

A savings of 75 percent on oil and oil change labor has been realized. The Fullers filters cost only 75¢ more than those previously used.

In three years not one of the filters has broken, and not a grain of the Fullers Earth has entered an engine. Needless to say, the people at San Fernando are sold on these filters.

Are you one of the tough ones? The big, strong, rock-crusher type who can lick his weight in 40 percent powder? If so give heed. Sometimes it pays to be a sissy. Here's what happened to a mechanic working a rock plant up in the Northwest.

He was working on repairing a truck when he cut his finger. Not a big slice; didn't even bleed very much. In fact, he kept right on working. He washed off some small parts in cleaning fluid and then blew them dry with an air hose. The compressed air stung the cut a little, but so what?

A short time later the mechanic, in great pain, staggered up to his foreman and collapsed. He was rushed to the hospital.

The doctor's diagnosis: Air bubbles in the blood stream and traces of cleaning fluid. The M.D. gave it to him straight: "Son, you almost died!" One cubic centimeter of air in the blood stream usually is enough to cause death.

A simple band-aid over the cut would have prevented the whole thing. Moral: Never use compressed air on an open wound. Get immediate treatment for any injury—even a scratch.

The ending? Happy. The mechanic recovered—but only after he spent four days in the hospital.

Your trucks, scrapers, dozers, tractors and transit mixers are in danger of serious engine damage—unless your drivers remember to "cool them out" after each trip. This is done quite easily by letting the engine idle for 2 or 3 minutes before shutting it off.

Nothing new in this idea; it's been around for years. But engine damage still results from drivers in a hurry who don't follow the rule.

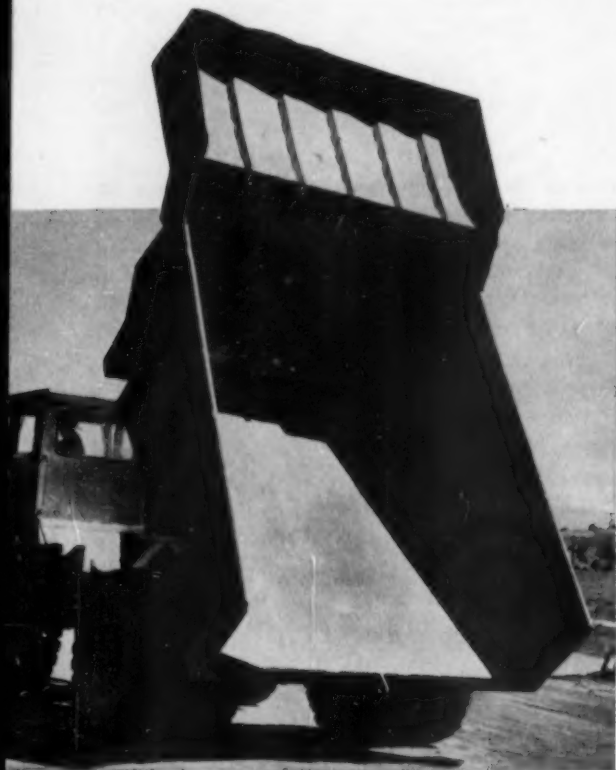
The idling helps reduce the extreme working temperatures generated inside the truck engine. The larger the bottling truck engine, the larger the metal mass to contain this heat, and the further the heat must travel to reach the atmosphere of the coolant.

A valve can be ruined on a diesel rig by a quick shut-down when it's off its seat, since the valve is still glowing hot. In any big engine, residual heat can damage many parts, such as valves, spark plugs, cylinder heads, carburetors and injection pumps. Damage can be severe and costly.

Put a reminder about this point in your next bulletin.

END

Proof that LW Haulpak[®]



*This body has been hauling
rock for over 4500 HOURS*

**delivers
steady
output

...needs
little
attention**



*...and look at these tires
after 4500 HOURS' USE*

An important reason why LeTourneau-Westinghouse Haulpak trucks give you lowest cost per ton-mile is because they need few repairs . . . work longer hours between maintenance stops. Consider the bowl . . .

Shown here is a 32-ton Haulpak body *after 4500 hours of hard service* — carrying 790,000 tons of ore and rocky overburden on hauls up to 10,000 ft*. Look at the super-strength 100,000 psi-yield floor. It's as good as new! Yet, on same operation, trucks with conventional-design bodies required constant repair and maintenance. Now look at the tires on this LW Haulpak . . .

Like the body, these tires have over 4500 hours' use on them. As you can see, they still have plenty of miles left! Owner reports tires on Haulpak last *twice* as long per ton-mile as those on other trucks operating on the same haul. Reason for this welcome added bonus: *Hydrair[®] suspension*. This exclusive air-hydraulic suspension system also cushions load and road shocks, keeps load riding level. Eliminated are springs, front-axle, and related maintenance.

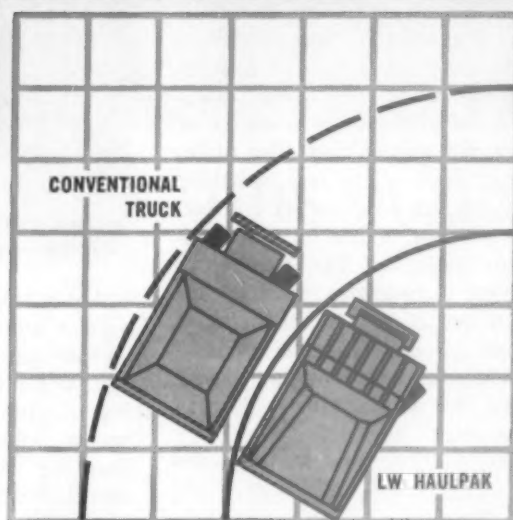
*Owner's name on request



Notice how exclusive V-shaped Haulpak body provides big capacity within short wheelbase. Also gives Haulpak lowest center of gravity, solid stability on turns and side-slope operations.

More reasons why LW Haulpaks deliver steady output and need little attention: *Double-reduction axle* eliminates planetary "hot box" inside rear wheels; *Short heavy-duty drive train* has half as many gears as ordinary trucks, needs 15% less hp to turn than other drive-trains; *Dry-type air cleaner* removes up to 99.8% of dust for efficient engine performance; *Bolt-circle wheel mounting* for easy service, less trouble. *Aircraft type multi-disc brakes* offer four times more stopping surface than most haulers.

Why not let your LeTourneau-Westinghouse Distributor give you *all* the facts on Haulpak. He'll also be happy to arrange a demonstration. 5 end-dump sizes, 22 to 65 tons. 90-ton bottom-dump also available.



1/3 shorter turn circle

In addition to a smoother ride and increased tire life, Hydrair suspension permits front wheels to turn at a sharp 45° angle ... because there are no spring or axle obstructions. Result: Haulpak turns in 1/3 less space than comparable-capacity haulers, and much shorter than many smaller rigs. You spot faster at load and dump, complete more cycles per shift!

HP-2424-G-2r



LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

NEW LITERATURE

For free information on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Twin-rotor impactor

Pennsylvania Crusher Div., Bath Iron Works Corp., has published a bulletin that describes its crusher designed for fine reduction of wet and sticky clays or shale without the problems of plugging and caking. The bulletin gives complete data including weights, dimensions and materials of construction for the twin-rotor impactor. The crusher is offered in two sizes, taking feeds to 6 and 8 in. The impactor is rated for capacities to 100 tph. in closed circuit crushing to produce 100 percent minus 8 mesh product.

Enter 600 on Reader Card

Ball bearings for centrifugal pumps

Peerless Pump, Hydrodynamics Div., Food Machinery & Chemical Corp., cites problems of axial and radial thrust in a bulletin discussing the various types of bearings available for use. Deep groove, maximum capacity and angular contact thrust bearings are all evaluated in detail. An analysis of the single

row versus the double row bearing is made with the advantages and shortcomings of each pointed out. Bearing replacement is also treated in the bulletin. A summation at the end of the factual presentation highlights five basic guidepost points for applying ball bearings in a centrifugal pump.

Enter 601 on Reader Card

Roller & idler rebuilder



Automatic Welding Co. has issued a bulletin containing data on an automatic machine designed for hard-metal resurfacing of tractor, crane or shovel rollers, idlers and wheels. This machine will accept rollers, idlers and wheels up to 40 in. in diam. The bulletin includes both photographs and descriptions of the construction and operational features of the machine. Highlighted are such features as the lazy susan rotating table and a balanced yoke. The bulletin also contains a convenient reference chart of hard surfacing wires—their grade, weld analysis and typical applications.

Enter 602 on Reader Card



Horizontal vibratory screens

Comco Corp. has released an 8-page bulletin that describes the company's line of horizontal vibratory screens and conveyors. The bulletin illustrates the screen's balanced-mass design and point-of-no-oscillation suspension with photos and drawings. A special section describes the screen's self-adjusting eccentric drive. Another section discusses the screen's uses.

Enter 603 on Reader Card

Track rebuilding equipment

Victor Equipment Co. has released a 16-page catalog picturing and describing the company's equipment for rebuilding track-type assemblies. Machines shown include: automatic roller and idler rebuilders, automatic grouser shoe and sprocket reconditioner, automatic track link welder, grouser bar welder, flux grinder, roller boring tool, roller flange flame hardener, roller and idler press, roller and idler grinder, pantograph and accessories.

Enter 604 on Reader Card
Please turn to page 156

Enter 1265 on Reader Card

1 year old

1-yard Marion backhoe
stripping overburden.



6 years old

1½-yard Marion shovel has been
loading limestone on a nine-hour
shift, five days a week basis since
1954. Yet to experience any major
downtime.



15 years old

¾-yard Marion crawler crane in
dropball service. Still performing
well without exceptional or major
repairs.



A FAMILY OF MARIONS WORK THIS QUARRY

There are no magic formulas for this kind of dependability. Marions thrive on tough digging and general hard work such as is being experienced in this Virginia limestone quarry. As is true with all Marion excavators, they are designed on the philosophy that every job is a "tough one." And, performance figures on numerous quarrying operations around the world bear this out. How about you? Getting the kind of profit-making dependability you should expect—and deserve—from your excavating equipment?



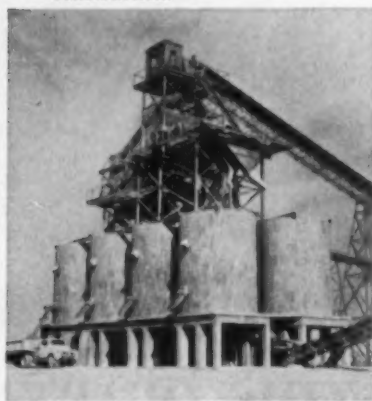
MARION POWER SHOVEL COMPANY

MARION, OHIO • A Division of Universal Marion Corporation

here's why **MARIETTA**

cuts bulk storage costs

When you store bulk materials . . . you want a storage system that is safe, economical and fits your materials handling concept. Here's where Marietta comes in. Every Marietta Industrial Storage System is engineered to meet precise requirements. And yet, Marietta industrial silos have a built-in flexibility that allows for future use as well as present need. That's because Marietta applies more than 40 years of experience to every phase of planning, design, fabrication and construction.



Standard Industries' new Tulsa production system is built around these Marietta silos.

A Marietta System saves you money, too. It eliminates expensive bagging and ground storage losses. And, it works with any materials handling system to cut costly delays in moving materials to trucks, railroad cars or processing areas. Only Marietta makes four types of concrete staves to give you the silo that best meets your requirements. So, if you store bulk materials . . . consult Marietta for a system that's based on your own particular needs . . . you get fast design and quick erection, too. Write for our Industrial Storage Catalog today.

Marietta CONCRETE DIVISION
AMERICAN-MARIETTA COMPANY
MARIETTA, OHIO

Branch Offices: Baltimore 21, Md.
Charlotte 6, N.C.
Jamestown, N.Y.
Representatives in principal cities

Enter 1236 on Reader Card

New Literature

continued from page 154

Electrostatic precipitators

American-Standard Industrial Div. has made available a 12-page, three-color illustrated bulletin describing the company's new line of electrostatic precipitators. The bulletin discusses the air pollution problem and how it is solved with precipitators. Principles of electrostatic operation are described; a three-color schematic drawing accompanies the operating principle description. General specifications for the line are outlined and illustrated with cutaway photographs. All major operating components are labeled.

The bulletin also includes descriptions and illustrations covering electronic controls and the high-voltage rectifier. Each of four types of rectifier available with the precipitator is discussed. Several photos of typical applications and installations of the equipment are also shown.

Enter 605 on Reader Card

Backing agent

Nordberg Mfg. Co. has released a 6-page bulletin describing its non-metallic backing agent. The procedures for backing crusher members, on the job, are shown and described. The backing qualities of the product are shown by means of photographs. Order requirements for shipping are explained and a prepared chart lists quantity requirements for both standard and short-head cone crushers. Also included in the bulletin is an information sheet and order blank.

Enter 606 on Reader Card

Drilling equipment catalog

Mobile Drilling, Inc., has made available an 80-page catalog that covers the company's complete line of hydraulic-powered drill rigs, tools and accessories. The catalog is fully illustrated and gives detailed descriptions, in-

cluding specifications, on over 1,900 items related to rotary drilling and soils exploration.

Included is a water-air selector table that permits drill operators to determine the correct gpm. of drilling fluid or cfm. of air required for rotary sampling and coring. Also given is a revised preface to the sample tool section explaining techniques of modern subsurface exploration. The catalog is cross-indexed and divided into nine sections ranging from drill rigs, to soil sampling and rotary tools and accessories, to drilling equipment.

Enter 607 on Reader Card

Automatic controls

Synchro-Start Products, Inc. has published an illustrated catalog that covers the company's entire line of automatic controls. Included in the illustrated catalog are: full automatic engine controls, small automatic engine controls, safety shutdown and alarm controls, governors and speed sensitive switches, d.c. solenoids, miscellaneous controls, auxiliary engine accessories and universal controller.

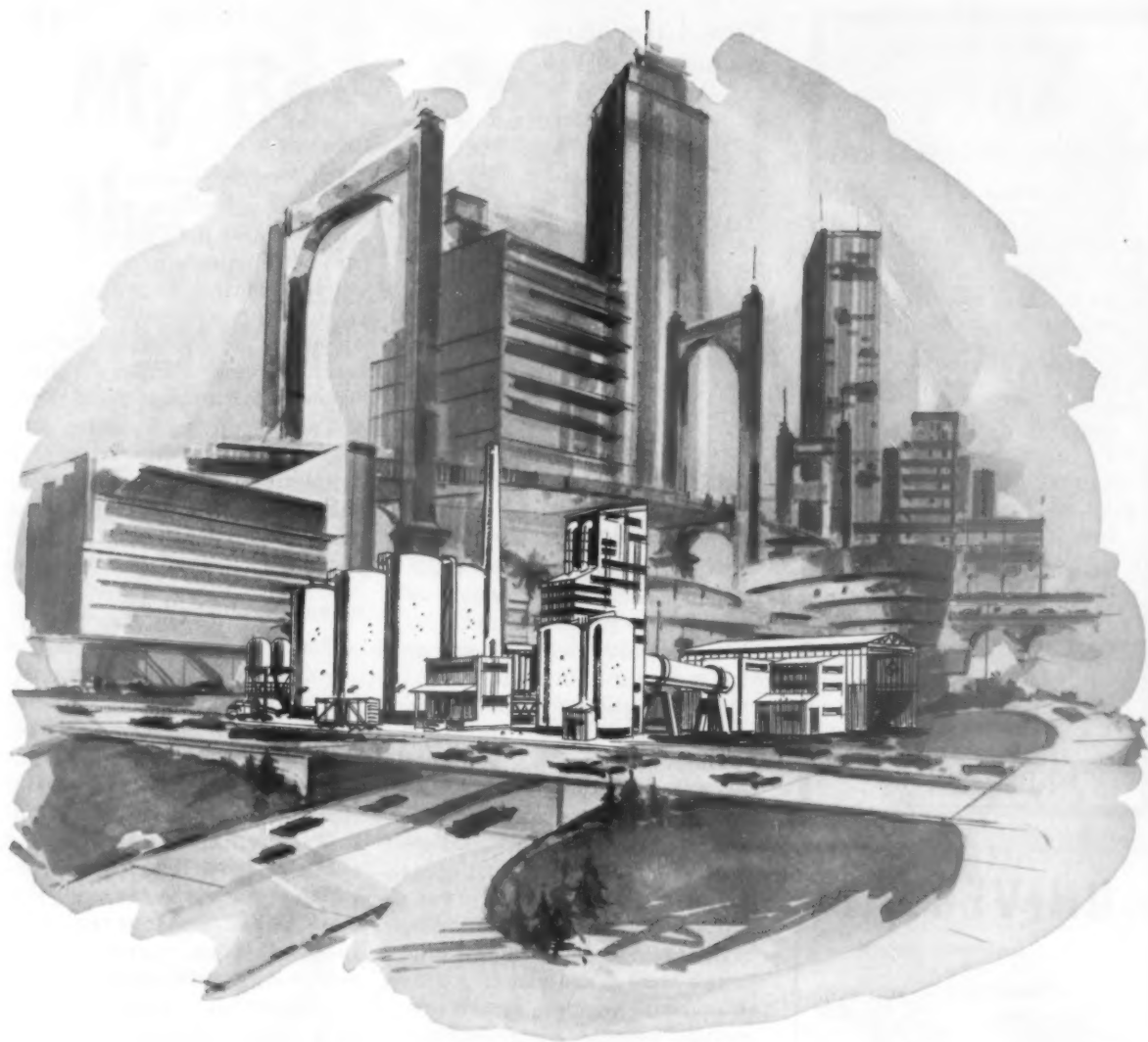
Enter 608 on Reader Card

Magnesite-chrome brick

H. K. Porter Co., Inc., Refractories Div., has announced the availability of literature on a burned magnesite-chrome brick for use in rotary kiln hot zones. This brick picks up and maintains a coating in kiln service. It is claimed to have good spall resistance and provides uniform strength under stress from hot face to cold. It is supplied with dimple cladding which provides built-in expansion and eliminates the need for paper shims. The literature describes what it is, where it is used, user benefits and physical properties.

Enter 609 on Reader Card

Please turn to page 158



Feeding the roots of progress in the cement industry

Cement—the matrix of world construction—is in the USA a 1.3 billion dollar industry. Continuing technological advances keep this basic industry efficient, competitive and responsive to changing requirements in building and construction. Fuller Company, whose pneumatic materials handling and process equipment figures in a wide range of industries, plays an important role here.

In more than 35 years of growing with the industry, Fuller has pioneered

manufacturing innovations now standard in the field . . . techniques and equipment that have influenced vast improvements in the design of entire cement-producing plants. In these years Fuller has built an *integrated* organization—Dracco Division, Traylor Engineering & Manufacturing Division, Sutorbilt Corporation and Lehigh Fan and Blower Division. They are combined to provide the cement industry everywhere with advanced research, with the design and manufacture of equipment

for crushing, grinding, preheating, burning, cooling, blending, heat transfer, conveying, dust collection and process control. Fuller is now able to undertake contracts for complete new plants for cement manufacturing and for the modernization of older ones.

Fuller is more than ever qualified today to help cement producers keep cement competitive in prices and quality with existing alternate materials and those to come. For more details on Fuller's capabilities, write today.

2880
G-244

See Pit & Quarry Handbook for details and specifications

Fuller

FULLER COMPANY • 102 BRIDGE ST. • CATASAUQUA, PA.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION • OFFICES IN PRINCIPAL CITIES
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Dracco • Lehigh Fan & Blower • Traylor Engineering & Manufacturing • Sutorbilt Corporation



**SAVE UP TO
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Bucyrus-Erie 22B Extra Heavy 26"	\$24.50 ea.
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820 Lorain 34"	\$59.00 ea.
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For Further Information, call collect

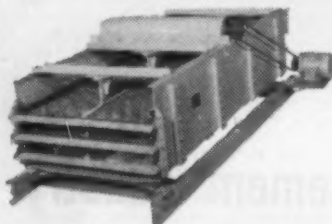
Highlands 2-4160

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STEEL PARTS DIV.
53 GERARD ST.
BOSTON 19, MASS.**

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UNIVERSAL



Type "F" 42" x 96" Triple Deck

UNIVERSAL VIBRATING SCREENS have earned an enviable reputation for Efficiency and Dependability since they were first introduced a little over forty years ago. The Outstanding Performance and Low Maintenance cost of UNIVERSALS has been the result of their Simplicity of Design and Construction. Yet, UNIVERSALS have consistently cost less than other makes of comparable quality . . .

Write today for Free Literature on Screens and Screening.

**UNIVERSAL VIBRATING
SCREEN COMPANY**

P. O. BOX 942 RACINE, WIS.

Quality Screens Since 1919

Enter 1282 on Reader Card

New Literature

continued from page 156



Eye & face protection

Mine Safety Appliances Co. has released a new selection of eye and face protection for a variety of industrial applications that is described in an illustrated catalog. Highlighted in the 40-page catalog is the Sightgard line of eyewear. It is said that this eye protection provides high optical quality and impact strength in excess of specifications, and meets individual needs and preferences through a variety of frames, temple styles, bridges and lenses. Also reviewed in the catalog are vision testing equipment, goggles, faceshields, welding helmets, accessories and parts.

Enter 610 on Reader Card

Air-quenching clinker cooler

Allis-Chalmers Mfg. Co. tells in a new bulletin how its air-quenching clinker cooler is able to recuperate more than 75 percent of sensible clinker heat and return it to a rotary kiln as highly preheated secondary air for more efficient combustion.

Cooler features described in the bulletin include a new undergrate pulsating damper which permits carrying deeper clinker beds, gives high possible secondary air temperatures, extends grate life and a device which provides continuous control of clinker bed depths.

Enter 611 on Reader Card

Lime slaker

B-I-F Industries has issued data on the problem of slaking lime, to obtain homogeneous mixtures, to eliminate grit and clinkers and control hot, dust-laden vapors. This extensive data, accompanied by various bulletins, describes the company's lime slaker. The two-page data sheet and accompanying bulletins contain illustrations, dimensions and a description of the operation, uses and advantages of the company's equipment.

Enter 612 on Reader Card

Bucket elevator bulletin

Barber-Greene Co. has issued a bulletin covering the company's entire line of bucket elevators for the handling of all free-flowing bulk materials. The bulletin contains general information about bucket elevator applications and some of the types available from the company, including standard enclosed vertical, positive-discharge, open inclined, super-capacity and double-leg grain elevators. Included are data on both centrifugal-discharge and continuous elevators, a section on selection of the proper type of elevator for a specific application and a selection table showing the recommended elevators for more than 80 commonly handled materials.

Enter 613 on Reader Card

**Mineral and chemical
processing equipment**

Denver Equipment Co. has made available a catalog on the company's line of equipment for mineral and chemical processing. The catalog is divided into two sections: pumping equipment and agitators and mixers. In each section are shown charts, specifications, diagrams and illustrations to list the various types.

Enter 614 on Reader Card

Please turn to page 164

"My Boss Read the Specs with Tears in His Eyes"



He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier —" (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.



Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3' to 18'.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 102 Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

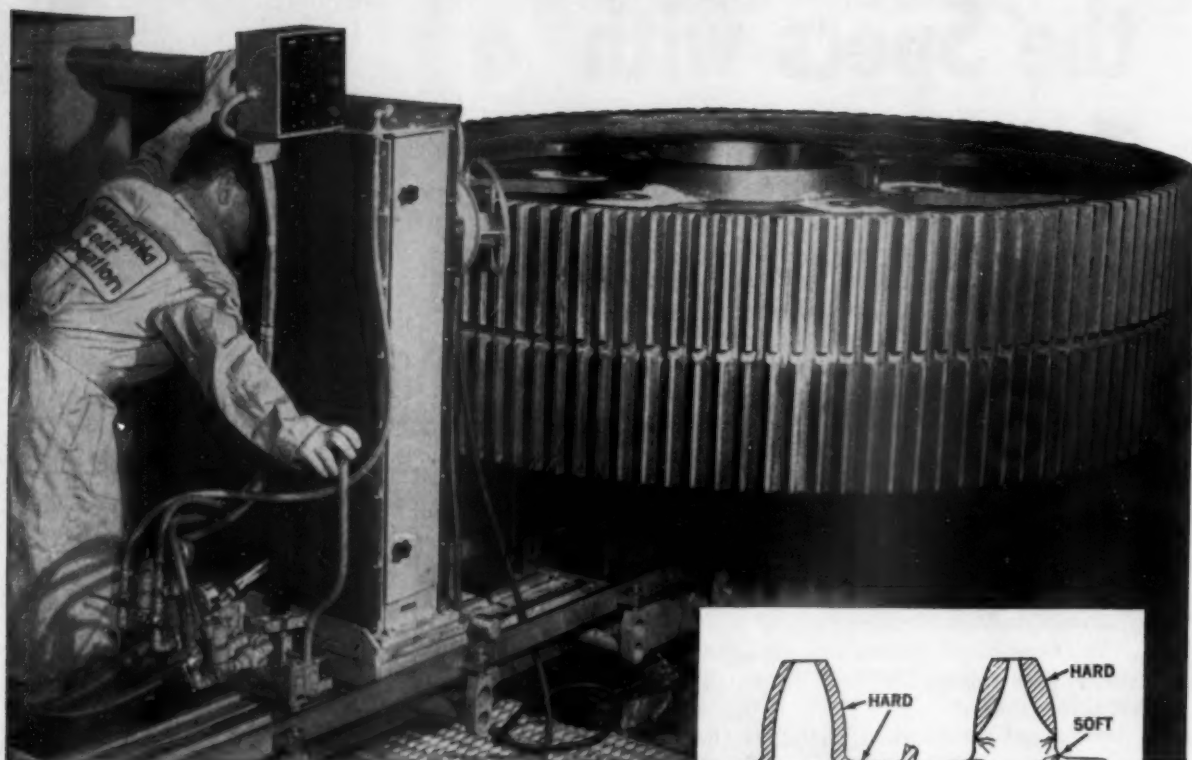
STURTEVANT MILL CO.

Dry Processing Equipment

The "OPEN-DOOR" to lower operating costs over more years

MIXERS
BLENDERS
ELEVATORS
AIR SEPARATORS

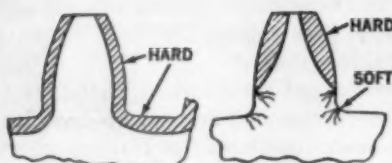
New Philadelphia induction hardening increases life of large gear drives...



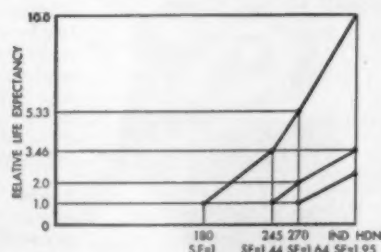
HERE'S WHY: Full tooth contour induction hardening of large gears provides a uniformly hardened surface from one tooth flank around the root and up the other flank without interruption. Eliminates points of thermal stress concentration. And there is no distortion, a problem of heat treated gearing that requires subsequent grinding.

This new, advanced Philadelphia method permits radical reduction in sizing and/or increased load carrying capacities. And it can easily harden even the largest spur, helical and herringbone gearing up to 180 inches in diameter, 20 inches in face, and 3/4DP.

Learn more about this new method for increasing the service life of your gear drives. Write for your copy of Bulletin 100.



New Philadelphia full contour induction hardening (left) provides a continuous hardened area from one tooth flank around the root and up the other flank without interruption. There are no points of stress. Typical heat treated gear (right) shows inadequate hardening of root of tooth, a point of major stress.



This chart shows the relationship between load and gear life. Note that the improved service factor of a gear set may be used to substantially increase gear life, rather than to increase the load.

phillie gear®

PHILADELPHIA GEAR CORPORATION

King of Prussia (Suburban Philadelphia), Pennsylvania

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READER-SERVICE CARD

RP-9-61

ROCK PRODUCTS

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SEPTEMBER, 1961

Chicago 3, Illinois

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- 2. New Machinery**
- 3. New Literature**

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79 W. Monroe St.**SEPTEMBER, 1961**
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HOW MUCH automation ... and WHEN?



BAILEY 700 SYSTEMS can help you make sure ... with step-by-step benefits

Many important—and profitable—improvements in operations can be accomplished with analog and digital computer equipment.

Too much, too soon, however, can be costly—as can too little, too late. Intermediate stages of refinements in measurement and control are desirable and necessary. These not only can produce substantial benefits, but can demonstrate the additional improvements possible with further—or ultimately complete automation. Bailey step-by-step automation assures against loss of prior investment.

Bailey engineers can help you determine optimum usage of *Bailey 700 Analog and Digital Systems* in your operations. They are equipped, by broad experience, to provide single-source responsibility from sensing and measuring instrumentation to complete automation. *Bailey 700 Systems* are installed, in operation, or on order, at locations from coast to coast and throughout the world.

Find out what this Bailey experience can offer you. Contact your Bailey District Office.

SIX STEPS TO FULL AUTOMATION

Centralize and simplify information display—use analog and digital techniques to clarify information, aid operator understanding, improve reliability of interpretation, and save space.

Extend use of interlocks and limiting circuitry—use digital solid-state components to extend supervisory controls... minimize effects of human error.

Increase use of automatic sub-loops—simplify and standardize the starting, controlling, and stopping of major plant components and sub-systems.

Extend on-line controls—integrate sub-loops, interlocks, and limiting controls with conventional controls to secure automatic operation over full range, once unit is on the line.

Provide performance monitoring—add computing facilities to provide up-to-date calculations for operation improvement and maintenance scheduling.

Integrate all system elements—add start-stop control to provide full automation, the ultimate goal.

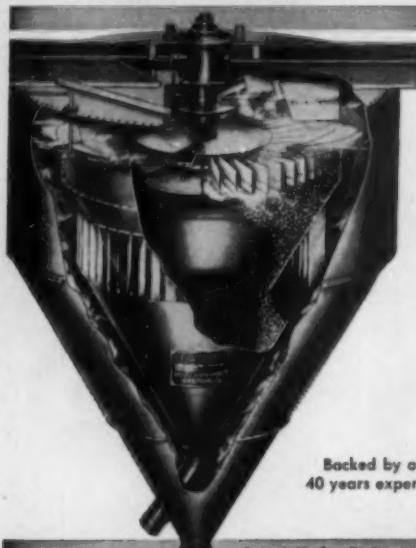
CEMENT DIVISION BAILEY METER COMPANY

1039 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal



**USING SCREEN SEPARATIONS?
NOTHING CLASSIFIES AS
PERFECTLY AS AIR**



Backed by over
40 years experience

UNIVERSAL ROAD MACHINERY CO.

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Factory and Laboratory: Kingston, N. Y.

In Canada: Watson-Jack Hopkins Ltd., Montreal

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GAYCO

CENTRIFUGAL AIR SEPARATORS

Classify practically all
dry fine materials

You get:

- CLOSER SEPARATIONS
- IMPROVED PRODUCTION

- NO UNDESIRABLE
OVERSIZE.

RANGE 60 to 400 mesh.

Timken bearings.

Choice of Standard or
Heavy-Duty Models.



this
helpful
booklet
sent
on
request

New Literature

continued from page 158



Screw conveyor calculator

The Thomas Screw Conveyor Co., Inc., has made available to all qualified engineers, an easy-to-read, five-window sliding computer that calculates conveyor capacity, component horsepower capacity, capacity conversion, material horsepower and friction horsepower.

Enter 615 on Reader Card

Portable crushing plants

Gruendler Crusher & Pulverizer Co. has released a bulletin that describes the company's line of portable primary crushing plants that roll loads at speeds up to 45 mph. Described and illustrated in the bulletin are: apron feeder, hopper, grizzly, jaw crusher and power plant. A page of detailed specifications and a diagram of the entire unit are also given. All of the crushing plants are available on straight skids for stationary plant installation.

Enter 616 on Reader Card



A NEW BOOK by JAMES A. NICHOLSON

GIVES YOU THE SCORE

Single Copies only \$5.00 each.

Five to twenty copies \$4.00 each.

"Ready Mixed Concrete", is an historical, authoritative account of one of the fastest growing industries in the world.

Written especially for people in the *Ready Mixed Concrete Industry* the book is a harvest of factual information on every fundamental phase of the business.

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ROCK PRODUCTS

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READY MIXED CONCRETE By J. A. NICHOLSON

Enclosed is my check (money order) for \$_____

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Sub-soil surveying

Associated Research, Inc., has released a 1961 version of its manual on locating subsurface gravel beds, rock deposits, as well as moisture-laden, unstable sub-soil. The method, described in the manual, utilizes conductance of the earth as measured by a portable electrical instrument weighing 20 lb. These measurements are effective even when gravel and sand strata are covered by layers of clay. Operation is not affected by extraneous noises, vibration or ground currents.

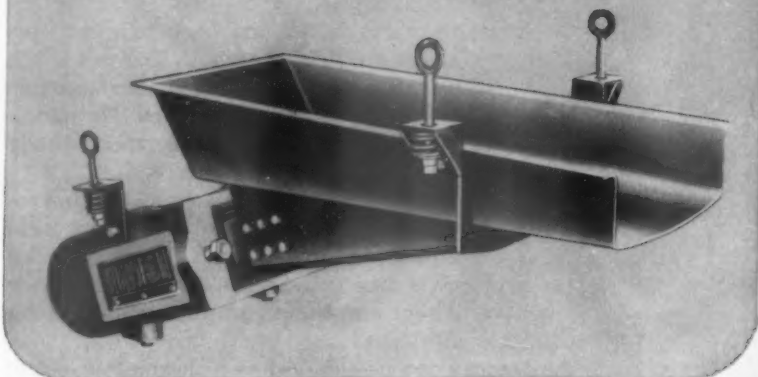
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REDUCE BULK MATERIALS HANDLING COST

SYNTRON

VIBRATORY

FEEDERS



HEAVY DUTY MODELS—HIGH CAPACITY, CONTROLLED FEEDING

Syntron Heavy-Duty Feeders have rated outputs of from 25 to 1000 tons per hour. They are designed to handle a great diversity of materials in a wide range of particle sizes—fine powder to large lumps, damp or dry, hot or cold.

Syntron Vibratory Feeders are plant proven for efficient, accurate, high capacity feeding, spreading, cooling, heating, and drying of bulk materials.

Syntron's high speed (3600 vibrations per minute) electromagnetic drive unit has few mechanical moving parts, insuring dependability and low maintenance. Magnet and springs are dust tight for longer trouble-free service. Instant control of amplitude permits quick, accurate adjustment of material flow.

Available for floor or suspension mounting with flat pan or tubular trough in sizes to meet every feeding requirement.



Feeding minus 5 inch stone from the primary crusher onto a belt conveyor.



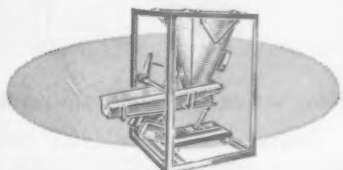
Write for Syntron's Catalog #605 and the name of the Representative nearest you.

81F5

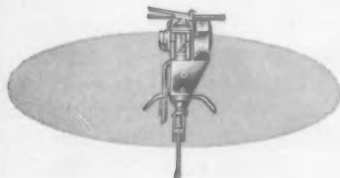
Other
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equipment
of proven
dependable
quality



Gravimetric Feeders



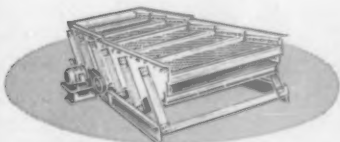
Dry Feeder Machine



Gasoline Hammer Rock Drills



Rectifier Power Units



Mechanical Vibrating Conveyors Screens

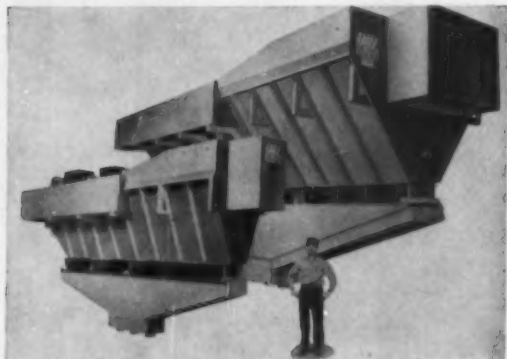
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SYNTRON COMPANY

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NEW MACHINERY

For free information on these ideas, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



New series of wide scalping tanks

Scalping and classifying tanks for sand preparation are now offered in a new series. These tanks are 10 ft. wide instead of the 8 ft. previously offered. As a result, a sand producer can achieve greater volume of production, sharper classifications, greater retention of ultra-fine materials or combinations of these advantages.

The new wide series tanks save on initial equipment costs for tanks and supporting structures and greatly reduce the headroom needed for installation. Five sizes are available from 24 to 40 ft. in length. Rail shipments are required or special permits for truck shipment of the new wide tanks. (Eagle Iron Works, 137 Holcomb Ave., Des Moines, Iowa)

Enter 200 on Reader Card

Welding rod holders

Two new welding rod holders of rugged design offer the user exceptional protection from arc heat. These holders were designed for 400 and 500-amp. service on large or iron-powder electrodes.

Both new holders are made of tong-type copper alloy, while two ball-point set screws hold the cable firmly while permitting immediate cable attachment. Insulation is made up of a number of layers of resin-bonded glass cloth. This makes a heat and impact-proof insulation that does not char with long use. (Tweco Products Inc., P.O. Box 666, Wichita 1, Kans.)

Enter 201 on Reader Card

New thermocouple

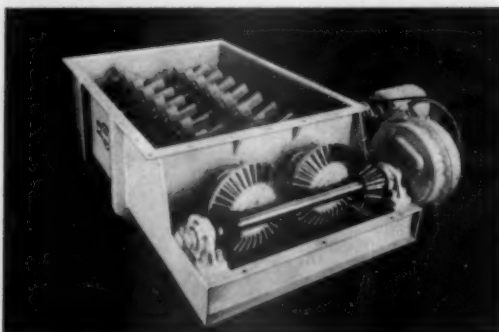
Corrosive atmospheres and high temperatures call for a heavy-duty thermocouple. Tempak is the name of a highly versatile, rugged thermocouple material developed for these conditions. The metal-sheathed, ceramic-insulated and spectrochemically clean unit is its own insulator and conduit.

The new device is expected to replace conventional thermocouples in practically every application in the rock products industry. It can be coiled or bent on its own radius. The ceramic insulation will not powder and the accurately centered wires will not short out.

Tempak can be supplied as a thermocouple unit with hot junction, bushing, head and other connections or it may be purchased by the foot in standard 35-ft. lengths. (Tempro Inc., 7030 Darby Ave., Reseda, Calif.)

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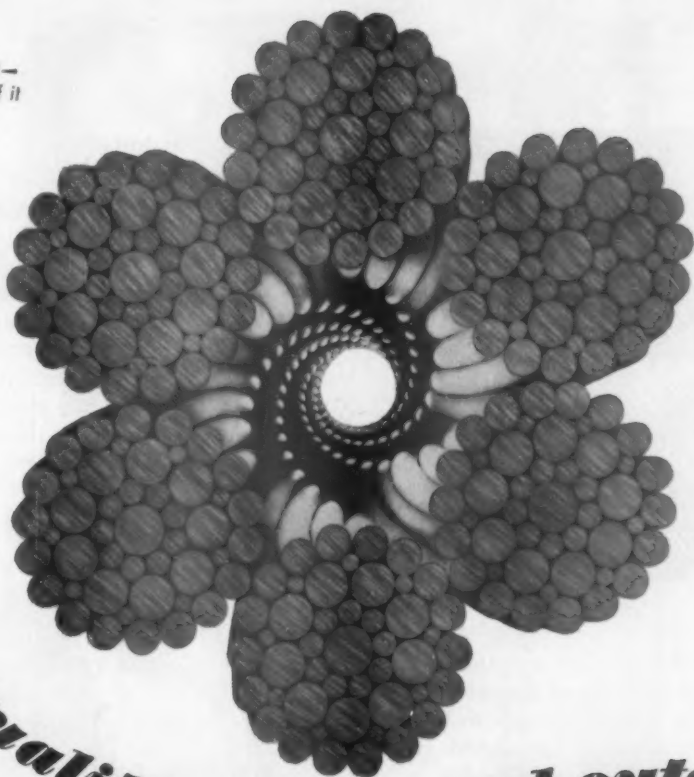
Clay breaker



Sand and gravel producers who are plagued with seams of clay in their deposit will benefit from a newly developed clay breaker. The new unit fits under a hopper, and the twin shafts are fitted with meshing manganese steel paddles which effectively break up clay balls coming through the hopper. Power is provided by a 7½ hp. motor, while a hydraulic sheave protects the drive from shock loads and from jamming. (McLanahan Corp., Hollidaysburg, Penn.)

Enter 203 on Reader Card
Please turn to page 168


We put a lot of work into it—
You get a lot of work out of it



Quality inside and outside

Two important angles on wire rope savings: the *quality* and *uniformity* Roebling builds all the way through Royal Blue Wire Rope. They give you a big, extra margin of service through every kind of wear and tear — and combine to make extra

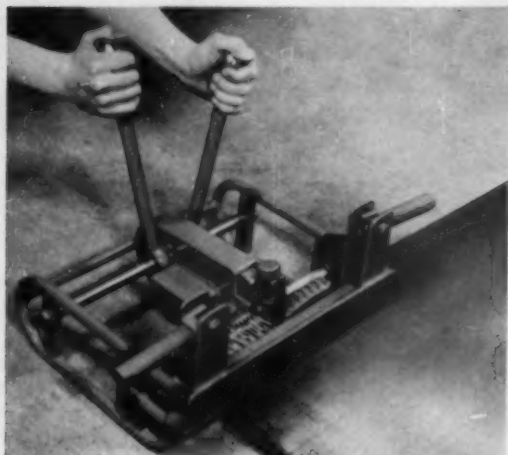
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The Colorado Fuel and Iron Corp.

New Machinery

continued from page 166



Conveyor belt zipper

"Hayden Zipper" is the name of a portable machine for making perfect splices of conveyor belting. The compact, 36-lb. machine is said to be the easiest one-man operation ever developed in a portable belt splicer.

Two spring-loaded clamps hold each end of the belt to be spliced firmly in position. Cam action exerts a holding pressure of 400 lb. on the belt and the thickness of the belt makes no difference to the machine. The mechanism then positions and crimps a set of finely ground tapered hooks that are supplied in a comb, ready to be inserted in the splicing machine. (Scandura, Inc., P. O. Box 949, Charlotte 1, N.C.)

Enter 204 on Reader Card

Hard-surfacing electrodes

A new line of four different types of electrodes is offered for the range of particularly severe operating conditions in the rock products industry.

An austenitic manganese-nickel electrode offers high-strength welds of carbon and alloy steels giving shock-resistant buildup and low friction hard-surfacing. An all-purpose electrode reduces the need for an inventory of special electrodes for a number of different conditions of abrasion resistance and heavy impact.

Where edge surfacing is more important than maintaining a heavy section, a spray-on rod is available. This rod goes on fast and produces a hard smooth skin. When surface preparation is needed before hardfacing, a piercing rod will do the job. This is useful for gouging out defective areas, venting cracks, piercing for lap welding and for cutting. (Stulz-Sickles Co., 929 Julia St., Elizabeth, N.J.)

Enter 205 on Reader Card

Engine control unit

A newly developed speed sensitive switch affords an opportunity to obtain as many as six elements instead of the three available in engine conventional governors. Normal speed of the switch may be as high as 7,000 rpm. or as low as 2,500 rpm. Any number of units can be adjusted to operate simultaneously while the governor shaft may rotate in either direction, mounted in any position and used with any standard drive and housing. (Synchro-Start Inc., 8151 N. Ridgeway Ave., Skokie, Ill.)

Enter 206 on Reader Card

Speed and service recorder



A record of the speed and rpm. of an engine is one of the most useful records that the maintenance superintendent can have. The record not only gives an indication of when an engine needs service or overhauling, it is a tool to control excessive operating speeds and destructive lugging.

Two new recorders have been introduced especially for the heavy-duty trucks in the rock products industry. One makes a record of the miles per hour of a unit; the other, of the revolutions per minute of an engine. Both units make a permanent record with a stylus on a 6-in. circular chart and record time and mileage at the same time.

Both recorders have a visible indicator of rpm. or mph. that the operator can see.

The rpm. model has an amber light to indicate overdriving and a red light to indicate lugging. The actual ranges for control are adjustable to the manufacturer's engine recommendations.

The mph. recorder has a red warning light normally set at 50 mph., but this can be reset to any speed. An odometer shows the total mileage driven. (The Service Recorder Co., 1013 Rockwell Ave., Cleveland 14, Ohio)

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Please turn to page 170

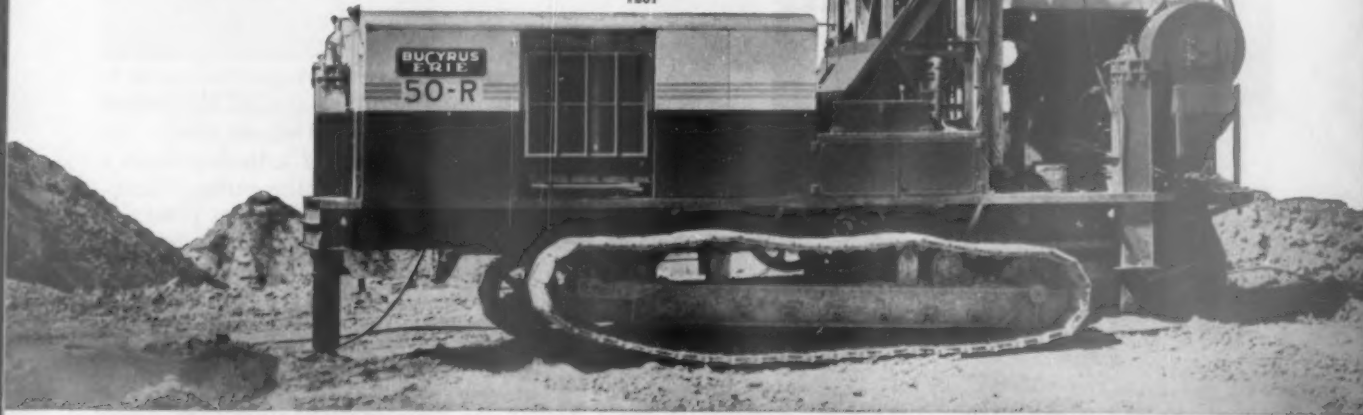
ACE IN THE HOLE

Bucyrus-Erie 50-R Rotary Drill

Variable control in both rotary speed and pull-down pressure play an important part in the performance of the 50-R. But 50-R owners have an invisible "plus" working for them that's equally important in the long run. It's the built-in Bucyrus-Erie durability that accounts for an unusually high percentage of "up time." It's ready when you need it.

As a clincher, Bucyrus-Erie blast hole drills are backed by the largest, best-equipped parts and service organization in the business. Let your Bucyrus-Erie salesman show you the big, tough 50-R in action. For full details, write Bucyrus-Erie, Drill Division, South Milwaukee, Wisconsin.

1861

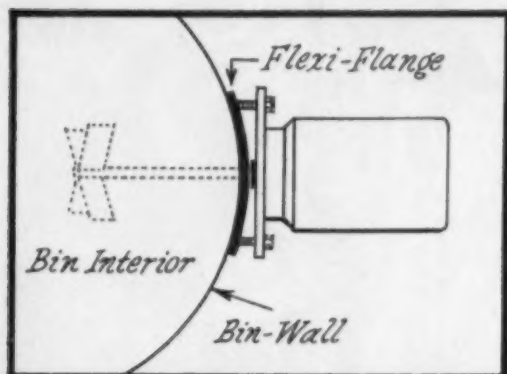


**BUCYRUS
ERIE**

most respected name in the field

New Machinery

continued from page 168

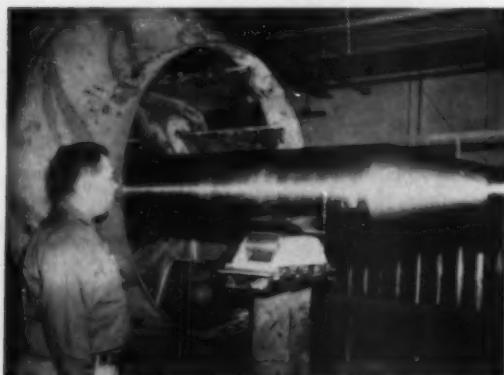


Bin level flange

Bin level controls may be more easily attached to curved surfaces or circular bins with Flexi-Flange. The new adapter can be used on chutes as small as 6 in. diam., and no other adapters or shims are necessary. The standard model is fabricated from aluminum, but a stainless steel unit is available. (Convair, P. O. Box 9671, Pittsburgh 26, Pennsylvania)

Enter 208 on Reader Card

Dynamic balancing machine



Fan wheels, sheaves, pump rotors or any other equipment that performs better with dynamic balancing may now be balanced on a new portable balancing unit. The PortaBalancer costs about one-third the price of a disc balancer and is said to offer greatly improved sensitivity and accuracy.

Since the new unit is portable, it may be moved to the site of the work. Fans, screw conveyors and impellers may be checked and balanced in place. (Industrial Balancing Engrs. Div., Calkins Machine & Tool Wks., E. Main St., East Aurora, New York)

Enter 209 on Reader Card

Hand-held tachometer

A self-contained, completely portable tachometer makes it possible for a maintenance man to measure the speed of rotating machinery. The unit has a photoelectric cell that permits fast, accurate speed measurement, even of machinery whose speed is changing. There is no physical contact between the tachometer and the machine to be checked.

The photoelectric cell senses a dab of paint or other reference marks on the rotating part. A signal is sent to a pulse-triggered computer which counts the revolutions and displays the results on a direct-reading dial. Three models are offered to give readings from 0 to 300 rpm. and up to as much as 24,000 rpm. (Simonds-Worden-White Co., 1101 Negley Pl., Dayton, Ohio)

Enter 210 on Reader Card

New horizontal screen

A horizontal vibrating screen of unusual design incorporates features which greatly improve its effectiveness. With a balanced-mass arrangement of the two decks, counterbalances are eliminated. Since the decks are supported at the center of oscillation, no vibration is transmitted to the base frame or supporting structure.

The positive, eccentric drive of the new screen is said to provide an action that conveys materials across the screen surface without sliding. The drive is self-adjusting, continuing its full stroke regardless of load.

Since the units are horizontal, they are ideal for conveying, washing or dewatering as well as sizing operations. (Comco Corp., 5421 Lancaster Ave., Philadelphia 31, Penn.)

Enter 211 on Reader Card

Lube pressure alarm

A line of automatic pressure relief indicators is offered for this manufacturer's central lubrication system. Should pressure build up in the oil or grease line, the automatic relief indicator sends a high-pressure impulse back to the central pumping point. This sets off the alarm at that point.

At the same time, pressure in the indicator allows lubricant to bleed out to the atmosphere and clearly designates the source of the trouble. Automatic relief indicators have 1/4-in. male pipe thread and are available with color-coded pressures of 1,000 psi. (green), 1,400 psi. (yellow), 1,800 psi. (red) and 2,200 psi. (orange). (Trabon Engr. Corp., 28683 Aurora Rd., Solon 39, Ohio)

Enter 212 on Reader Card
Please turn to page 172



E-M-pioneered Incher provides quick, safe spotting of mills. It turns mills literally inch-by-inch to desired position merely by pushing a button. One E-M Incher Control can be used to spot several mills.



ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

Specialists in making controls do
EXACTLY WHAT YOU WANT THEM TO

At Carbon Limestone Company...

"E-M INCHER SAVES US \$1,600 A YEAR"

... cuts starter maintenance by over 90%

● At Carbon Limestone Co., Hillsville, Pa., a limestone pulverizing mill must be stopped and spotted every four hours for lubrication. Spotting formerly took about 15 minutes and was done by "jogging" (flicking the starting switch to give the mill a momentary jolt of power). This slow, "hit-and-miss" method resulted in frequent production halts for repairs to the over-worked starting system.

To remedy this situation Carbon Limestone installed an E-M Incher. Result: Push-button spotting requiring only *one minute*. In the words of General Superintendent U. F. Masson:

The E-M Incher... "Increased productive hours of pulverizing mill 30 minutes in each 8 hours or 6¼%. Reduction of maintenance of starting equipment 90%."

The E-M Incher can save you big money, too, if you are now using one of the old, time-consuming methods of spotting synchronous motor driven mills.

Write the factory now for complete information about the Incher, and call your nearest E-M Field Engineer.



This mill at Carbon Limestone Co. is quickly positioned by the E-M Incher Control shown in the large illustration.

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REDUCE YOUR RATIO



OF FUEL -to- CEMENT

In these days of increasing fuel and labor costs, every economy you can make is important. Here is a sure way to **SAVE FUEL**. Cambridge Gas Analyzers will provide the Burner with a continuous and simultaneous record of the oxygen, carbon dioxide, and combustibles in the flue gas. O₂ analysis serves to warn against excessive air supply; combustibles analysis indicates oxygen demand under all conditions; CO₂ analysis reflects state of calcining process. Cambridge Instruments make uniform kiln operations possible with ease. Savings effected pay for installation in short time.



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Kiln tires, such as shown above, up to 14'-0" x 27", are cast in 4 pieces at the Bethlehem Foundry and preassembled at the shop to assure accurate, economical reassembly in the field. Exceptionally accurate alignment is assured by the tongue and groove machining and the use of fitted pins in reamed holes at final assembly.



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FOUNDRY & MACHINE CO.**
 CEMENT MILL MACHINERY DIVISION
 225 W. SECOND STREET, BETHLEHEM, PA.

Enter 1239 on Reader Card

New Machinery

continued from page 170



Tensioning bolt for screens

Screen decks can be changed and tensioned now in a fraction of the time formerly required. This is the claim of the maker of an ingenious slotted tensioning bolt.

One size bolt fits all sizes and types of vibrating screens, and each bolt may be assembled to give three different adjustments. Positive tension at each setting is assured with a tapered wedge that fits into the shank of the bolt. The wedge permits tension adjustment even while the screen is operating under load. A maximum of 1 1/4 in. adjustment is permitted on each side of the screen or 2 1/2 in. over-all, and it can be used to secure plate decks as well as screen cloth. (Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

Enter 213 on Reader Card

Engine stand

A new engine stand is offered to facilitate handling engines weighing up to 1,200 lb. Once the engine is bolted to the stand's adapter bracket it may be rotated through a full 360 deg. A self-locking gear set makes turning safe and easy. The lightweight stand weighs only 135 lb. but may be bolted to the floor for a permanent installation. (Owatonna Tool Co., 496 Cedar St., Owatonna, Minnesota)

Enter 214 on Reader Card

Dust respirator

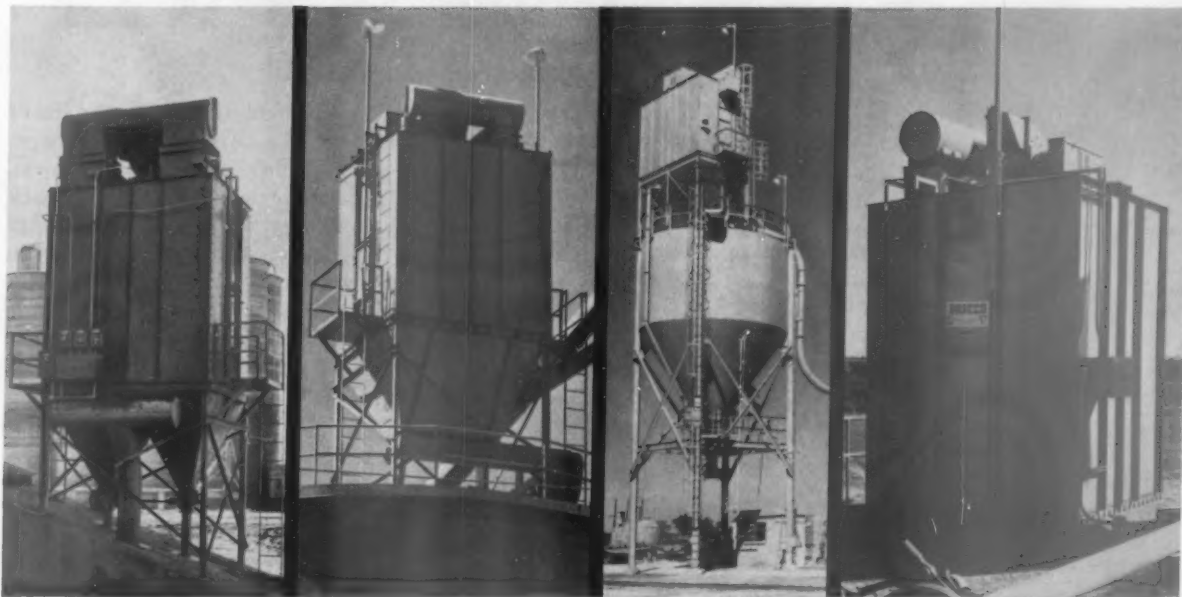
Workers who must be exposed to many of the dusty jobs in the rock products industry will find a new eye shield and respirator of great value. Glasses or goggles may be worn in comfort under the facepiece of the new respirator. The breather itself is fitted with an extra-large filter area, and two newly developed exhaust valves that are said to assure easy breathing. (Willson Products Div., 212 E. Washington St., Madison 10, Wis.)

Enter 215 on Reader Card

Please turn to page 174

DRACCO DUST COLLECTORS

*... on guard at
new Texas cement plant*



Clinker tunnel

Clinker silo

Bulk loading bin

Finish silo

■ At its new Midlothian, Texas cement plant, Texas Industries, Inc. employs Dracco Dust Collectors to guard production efficiency and prevent air pollution.

Texas Industries chose Dracco Multi-Bag Filters to control dust at its primary crusher, mill rooms, finish silo, bulk loading bins, clinker silo and clinker tunnel. Now in all these vital areas, valuable dusts are recovered and returned to process. The result: no dust nuisance, no abrasive wear of equipment, no loss of useful materials.

Controlling cement dust is one of the toughest jobs you can give a dust collector. But Dracco Collectors are built to take the beating

of round-the-clock duty, abrasive dusts and heavy dust loads. They offer the ultimate in collection efficiency, are recognized for their low maintenance costs.

Dracco offers a full range of equipment to solve any dry dust collection requirement: Uni-Filters for small problems, Multi-Bag or Uni-Bag Filters for general duty, Whirl-Clones for cyclonic collection, Glass-Bag Filters with patented sonic cleaning action for hot, corrosive dusts and gases including kiln exhaust. For full information or authoritative assistance, contact: Dracco Division of Fuller Co., Harvard Avenue and East 116th Street, Cleveland 5, Ohio.

DRACCO *airstream conveyors*
dust control equipment



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SPRAY NOZZLE
problem?



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of our
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For almost every spraying application, there's a Spraying Systems Data Sheet that gives useful information on suggested installations and types of nozzles to use. If you have a problem, write and let us know the application involved... and we'll send the Data Sheet that applies.



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And... for complete spray nozzle information, write for Catalog 24.

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Heat exchange a problem?
Handle more work—more efficiently—
with "HOLO-FLITE"
PROCESSORS



The secret is continuous bulk flow operation — far faster and more efficient than batch processing. Heating or cooling fluid circulates through the hollow shaft and flights of a conveyor screw, thus processing granulars, fluids, or sludges as they flow along. Gentle conveying action minimizes particle degradation and dusting. Broad operating range. Heats to 500°F; cooling range, 1800°F to 0°F. Multiple "Holo-Flite" tiers can be stacked for high capacities in minimum floor space.

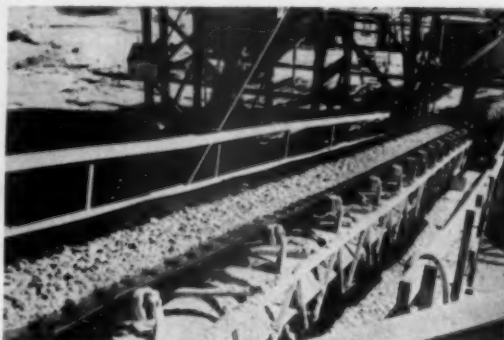
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**WESTERN
PRECIPITATION**

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New Machinery

continued from page 172



Ribbed conveyor belt

Chevron-shaped cleats molded on the surface of a rubber-covered conveyor belt greatly improves its efficiency when handling wet sand or gravel. The ribs prevent the material from washing back down an incline, and step up conveyor capacity when handling these materials horizontally or on an incline. If the chevrons are reversed, the water is channeled to the side of the belt where it flows off, thus acting as a dewatering device. (Raybestos-Manhattan Inc., Manhattan Rubber Div., Passaic, New Jersey)

Enter 216 on Reader Card

Jet cleaner for belt conveyors

High-pressure sprays can help keep belt conveyors free from buildup of wet, sticky materials. In this way, belt life is prolonged and idler damage is prevented.

Multiple nozzles at the head pulley direct water at 135 to 150 psi. on the belt, with minimum pressure of 30 psi. required for good results. If necessary, detergent may be added to the system. (Sellers Injector Corp., 1600 Hamilton St., Philadelphia 30, Pennsylvania)

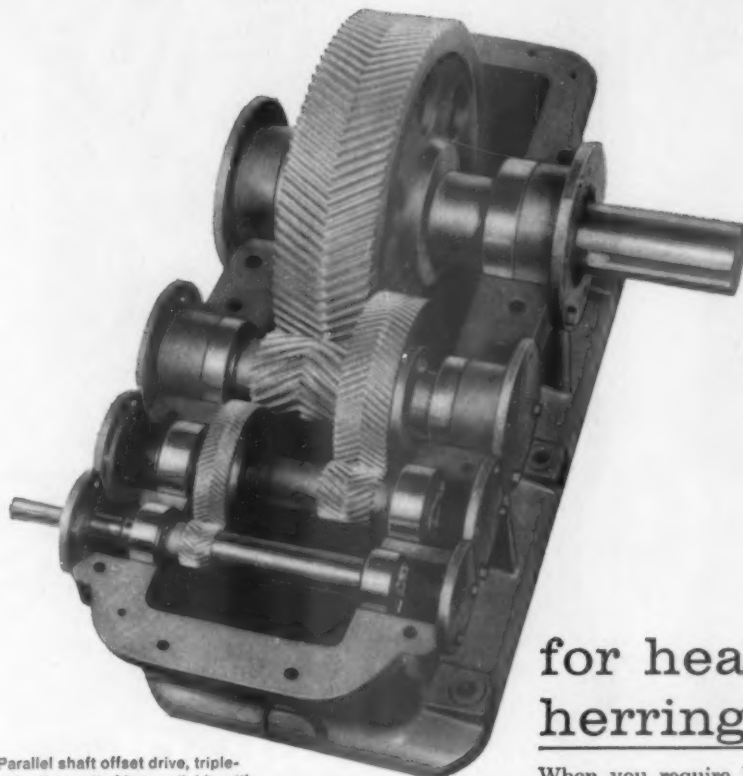
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White paint for galvanized metal

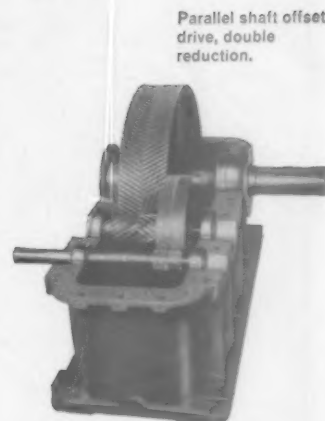
Galvanized metal surfaces in rock products producers' plants now can be protected with a white paint that sticks effectively without surface preparation. Galvinoleum is a white paint that has been especially prepared for use on old or new galvanized ducts, roofing and other sheet metal surfaces. In addition, it is claimed to be just as suitable for painting aluminum and terne plate structures. (Rust-Oleum Corp., 2425 W. Oakton St., Evanston, Ill.)

Enter 218 on Reader Card

Please turn to page 176



Parallel shaft offset drive, triple-reduction unit. Also available with in-line drive design.



Parallel shaft offset drive, double reduction.

for heavy loads, use herringbone reducers

When you require heavy-duty drive units, D. O. James herringbone gear reducers provide unequaled advantages:

Strongest tooth form — due to the arch-like construction of the tooth and large 30° helix angle.

Greatest load-carrying capacity — large multiple-tooth contact in plane of action — full width of the tooth face is utilized.

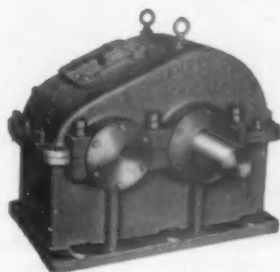
No side thrust — thrusts of the opposing helices tend to balance each other, distributing load evenly across the face of tooth. Housing is economical because no provision for side thrust need be made, nor are thrust bearings required.

Improved splash lubrication — an oil film is formed and preserved by the wedging action of the teeth.

High efficiency — 98% on single reduction units.

These reducers are made in 110 standard sizes, single, double, and triple reduction, 2:1 to 370:1 ratios, .5 to 5000 hp.

For complete information, call your D. O. James representative or write today. Ask for Catalog 40-E.



Parallel shaft offset drive, single reduction.



D. O. JAMES GEAR MANUFACTURING CO.
1140 West Monroe Street, Chicago 7, Illinois
Since 1888, every type of cut gear and gear reducer

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D.O. James

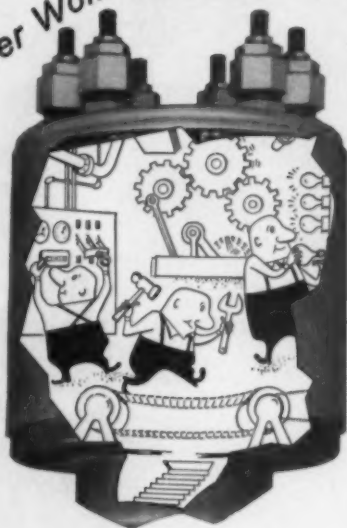


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A NEW BOOK BY

JAMES A. NICHOLSON

GIVES YOU THE SCORE

"Ready Mixed Concrete," is an historical, authoritative account of one of the fastest growing industries in the world.

Written especially for people in the Ready Mixed Concrete Industry the book is a harvest of factual information on every fundamental phase of the business.

Give a copy to every employee who has a hand in YOUR reputation for quality mixes, and in YOUR profits. Order your copies today.

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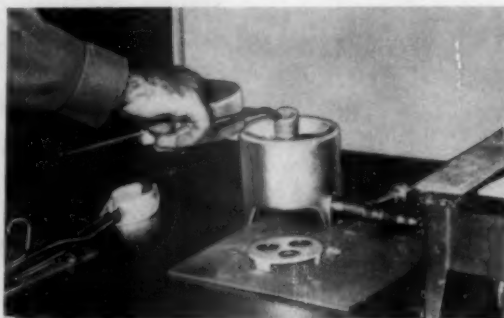
STREET

CITY ZONE

STATE

New Machinery

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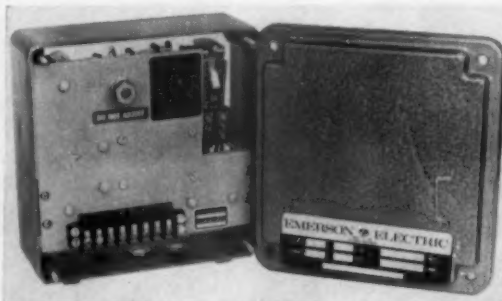


Laboratory furnace

A unique, bench model gas-fired furnace is available for making portland cement clinker from raw mix samples. The midget furnace takes only 20 min. to reach the 2,400 deg. F. temperature needed for the clinkering operation. It needs only 3 psi. air and gas at 7 to 10 in. wg. for proper operation. This unit saves time in the clinkering test and frees larger furnaces for quality control and other tests. (Selas Corp. of America, Dresher, Penn.)

Enter 219 on Reader Card

Three-phase protector



PhaseGuard is the name of a new static transistorized device that protects motors and electrical equipment from voltage unbalance or phase-failure. It operates from voltage signals and can be used on delta or wye, on 3 or 4-wire systems.

When an unbalanced voltage condition exists, the transistorized electronic circuit triggers a relay. Operating time is about 30 to 52 milliseconds, and the device resets itself when normal phase conditions return. The new equipment is available for voltages between 200 and 250, 380 and 440, and 550 and 575, and for 50 or 60-cycle power systems. (The Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 36, Mo.)

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Please turn to page 178



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RED-STRAND!

Black . . . the most attractive color in bookkeeping. There's no magic formula for staying in the black, but careful consideration of the right type and make of wire rope can cut costs substantially—10%, 20% or more.

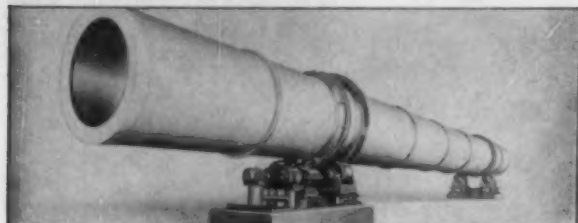
RED-STRAND users are accustomed to longer-than-expected wire rope service, because higher-than-catalog-rated quality is built into the rope.

They know that Leschen distributors and field men make sure they have the best rope construction for the job at hand. They know, and you can too, that for wire rope and sling needs—specify RED-STRAND and stay in the black! For the name of your nearest Leschen distributor write: Leschen Wire Rope Division, H. K. Porter Company, Inc. 2727 Hamilton Avenue, St. Louis 12, Mo.

PORTER

**LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.**

THE KILN OF TOMORROW . . . TODAY DESIGNED AND BUILT BY: VULCAN THE OLDEST NAME IN ROTARY KILNS



SIMPLE . . . ECONOMICAL . . . RUGGED . . .

HERE ARE THE NEW PATENTED FEATURES:

NEW self aligning trunnion rollers

NEW constant thrust load control

NEW integration of girth gear and riding ring



NEW application of anti-friction roller bearings

Vulcan's new kiln in your operation will simplify your foundation plans, lower cost of erection, decrease maintenance costs, and cut down-time . . . Write today for more information.

111 YEARS OF KILN EXPERIENCE

MEMBER: NATIONAL LIMESTONE INSTITUTE, INC.

VULCAN IRON WORKS, INC.

WILKES-BARRE, PA.—CABLE ADDRESS: VULWORKS

COOLERS—DRYERS—RETORTS—CALCINERS—SUGAR MILLS—SHEAVES
VERTICAL LIME KILNS—STEEL CASTINGS—GEARS TO 24" DIA.

Enter 1243 on Reader Card

Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.



Buy WILFLEY
for Cost-Saving
Performance

**A. R. WILFLEY
and SONS, Inc.**
Denver, Colo., U.S.A.

WILFLEY
centrifugal PUMPS

Enter 1244 on Reader Card

WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the "WHERE TO BUY" Section

New Machinery

continued from page 176

High-speed backstop for reducers

A new series of backstops is now available for the high-speed shaft of reducers which operate in the dusty, heavy-duty atmospheres so common in the rock products industry. With heavy construction and alloy steels, the new backstops offer exceptional wear resistance and long life. Special seals withstand the effects of heat, while a finned oil reservoir maintains lubrication at high speed.

Torque capacities of the new backstops range from 140 to 1,900 lb.-ft. on shaft diameters from 1/2 to 2 3/4 in. Maximum over running speeds range from 1,800 to 3,000 rpm. on the inner races. The new units may be installed on the extended input shaft of virtually any enclosed gear reducer. (Formsprag Co., 23601 Hoover Rd., Warren, Michigan)

Enter 221 on Reader Card

Semi-automatic welding

A new combination welder makes it possible to use all of the regular semi-automatic welding processes. The change from one process to another may be made in a matter of minutes.

The Multi-Wire welder provides complete facilities for the small-wire, all-position gas shielded process, the large-wire CO₂ process, the combination tubular or fluxed wire and CO₂ process, hard-surfacing and the submerged arc welding process.

Included in the welding package are a motor generator power source, a wire feeder and control circuit, a cooling water system, a wheeled truck and a set of the six available gun and cable assemblies. The generator is rated at 500 amp. at 40 v. dc. with a 100 percent duty cycle. (Hobart Bros. Co., Troy, Ohio)

Enter 222 on Reader Card

Dry lubricant for heavy loads

Dri-Slick is the name of a newly developed graphite lubricant that dries to a hard, slick finish within 30 min. after application. Apparently, the dry coating cannot be squeezed out under heavy loads, will not wash off and will stand up under temperatures between -65 and 800 deg. F. In addition, the new lubricant will not attract dust and is corrosion resistant.

It is said to be ideal for open gearing, open chain drives, wire rope, outdoor cranes, railroad switches and the slides of lift trucks. The lube is supplied as a liquid in 1-gal. cans and is applied with a brush. (G. W. Smith & Sons Inc., 1700 Spaulding Rd., Dayton 32, Ohio)

Enter 223 on Reader Card

END



New Series 100 Hammerdril

chip size proves Hammerdril
puts more *bite* in your bit
because it cleans as it drills



When it comes to chips, think big. Big chips are a sure sign of economical drilling action, the kind that saves air, speeds drilling rate. With the Series 100 Hammerdril[®] air either drills or cleans. You can start at once with this dependable bottom hole pneumatic impact tool on your present rig and 100 psi compressor. Simply adjust the Hammerdril with the proper positive choke to suit your compressor. Then dig in, using the Mission Hammerbit[®]. The heavy tungsten-carbide inserts can be dressed in the field.

Write for new bulletin.

MISSION
MANUFACTURING CO.

HAMMERDRIL

P. O. BOX 4209 • HOUSTON, TEXAS / OVER THIRTY YEARS OF DRILLING RESEARCH

MANUFACTURERS NEWS



Bupp app't dir. of purchases

Alexander L. Bupp has been appointed director of purchases of Bucyrus-Erie Co., South Milwaukee, Wis. A 22-year veteran with the company, Mr. Bupp formerly was director of planning. He will continue to direct the company's commercial evaluation activities. A graduate of Lehigh University, he joined Bucyrus-Erie as a special apprentice. He subsequently was a sales correspondent, sales engineer, assistant manager of the company's International Div. and assistant treasurer.

Road Show committee completed

The Board of Directors of the Construction Industry Manufacturer's Ass'n (CIMA) has announced the completion of committee appointments for the 1963 Construction Equipment Exposition & Road Show. Three

committees have been added: Housing Committee, Rules & Qualifications Committee and Space Allocation Committee. Chairmen of the new committees are: J. E. Mitchell, The Firestone Tire & Rubber Co.—Housing Committee; B. M. Wallis, Schield Bantam Co.—Rules & Qualifications Committee and A. J. Lichteninger, The Wellman Engr. Co.—Space Allocation Committee.

Hardinge app't vice president



H. DeForest Hardinge has been appointed vice president of Hardinge Co., Inc., York, Pa., and Hardinge Mfg. Co. Mr. Hardinge is a graduate of Deerfield Academy and Cornell University and also received his masters degree from the Cornell Graduate School of Business and Public Administration.

A-C organizes new dept.

Organization of the Cement Industry Dept. to handle the sale of all Allis-Chalmers products and services to the domestic cement and lime industries has

been announced by the company. Frank E. Briber, Jr., is manager of the new department which is composed of a number of account managers individually located in strategic market centers, and a process engineering group in Milwaukee, Wis. These market centers are divided into sections which include: Lehigh Valley, Eastern, Pacific, Western, Great Lakes, Midwest and Southern. The account managers will have the responsibility for serving specifically assigned accounts on a nation-wide basis. They will have the assistance of Allis-Chalmers regular district sales organizations.

McNally Pittsburg in India

The McNally Pittsburg Mfg. Corp., Pittsburg, Kansas, has joined with Bird & Co. (Pvt.) Ltd., Calcutta, India, in the formation of an Indian corporation to engage in the manufacture of heavy equipment to be used in India's basic industries. The new company will be known as the McNally-Bird Engr. Co. (Pvt.) Ltd. McNally Pittsburg is engaged primarily in the design, manufacture and construction of complete coal preparation plants but is a major manufacturer in the rock products industry. Bird & Co. has been engaged in a wide variety of basic industries in India for over 100 years. Control of the newly formed corporation will rest in McNally Pittsburg. It is anticipated that the new corporation will employ a few U. S. and British personnel.

Please turn to page 182

Expanda-Kraft offers "strongest, toughest shipping protection" says Owens-Illinois Executive

"We can recommend Expanda-Kraft unhesitatingly whenever a customer asks for strong, tough, maximum shipping protection that can be provided for his product—no matter whether it be alfalfa or yeast, asphalt or zinc sulphate, or anything in between," says P. L. Chism, Plant Manager, Owens-Illinois' Multiwall Bag Division, Valdosta, Ga.

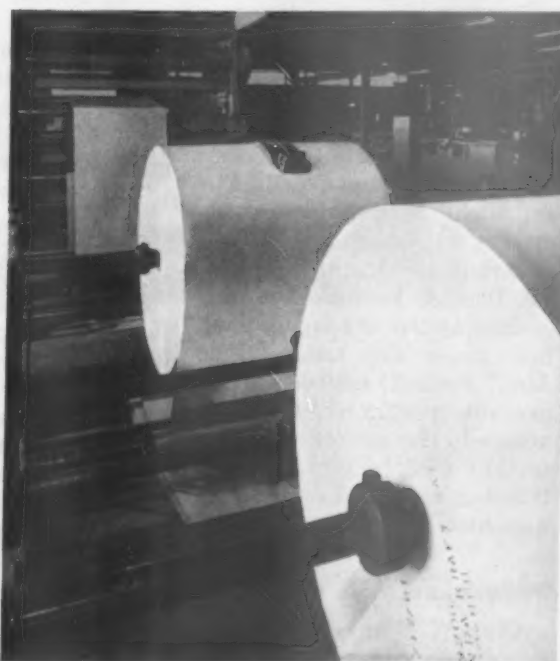
"In heavier bag weights, the Expanda-Kraft paper actually saves the customer money by reducing the total basis weight required, while furnishing more strength than can be available with comparable weights of standard flat kraft.

"Expanda-Kraft also produces a sharper and clearer printed image because it is less absorbent. Not only do we score an impressive bonus in appearance, thanks to Expanda-Kraft, but it also helps us cut down on ink and glue costs because of its lower absorbency," Mr. Chism reports.

"Our customers particularly appreciate the porosity of Expanda-Kraft paper, for it facilitates the escape of air during filling, a vital factor in maintaining efficient filling rates with valve-type bags. Ordinarily, this kind of porosity might connote high absorbency, but such is not the case with Expanda-Kraft."

Find out what Expanda-Kraft® can do to improve your package. *The H&W Division of Scott does not make bags. But we do make*

Expanda-Kraft paper in basis weights of 40 to 100 lbs. and in colors of Natural, Shell White and a clean, bright White. For infor-



mation and samples, write Hollingsworth & Whitney Division, Scott Paper Company, 230 Park Avenue, New York 17, N. Y. or 111 West Washington Street, Chicago 2, Ill.

Hollingsworth & Whitney Division
SCOTT PAPER COMPANY

Manufacturers News

continued from page 180

Hutchinson gains English license for vibrating screens

Hutchinson Mfg. Co., Houston, Texas, has announced that they have negotiated a special licensing agreement for an English manufacturer's line of vibrating screens. The line of Nia-Tex screens developed by Niagara Screens & Plant Ltd. of Enfield will be made in this country and offered for the specialized, heavy-duty applications in the rock products industry. Each screen will be custom designed to provide the correct size for each specific application. The angle of inclination will be calculated in order to give maximum screening efficiency and flow of material across the screen decks.

Materials handling on air

Douglas Aircraft Co. has granted an exclusive U. S. license to Clark Equipment Co., Buchanan, Mich., to manufacture and market a system for handling materials by floating them on air. Douglas has tested the air-cushion system in baggage handling under the name "Glide-Aire." Production models will be available next year, Clark announced. The system is similar to that used in vehicles which travel over ground or water on a cushion of air.

Willys elects Moss

Cruse W. Moss has been named executive vice president of Willys Motors, Inc., Toledo, Ohio, it was announced by Stephen A. Girard, president. Mr. Moss joined the Kaiser organization at Willow Run, Mich., in 1947, and became assistant general manager of Willys when the company was purchased by the Kaiser organization in 1953. He later became vice president in charge of sales.



Dr. Dorr resigns

The resignation of John V. N. Dorr (photo) from the board of directors of Dorr-Oliver Inc., Stamford, Conn., has been accepted, according to an announcement by W. L. Oliver, chairman. After formally expressing its regret, the board elected Dr. Dorr "director emeritus." As a director, he had also been honorary chairman of the board. The board has elected R. H. Dorr a director of the corporation.

Dr. Dorr founded The Dorr Co., one of the two principal predecessors of Dorr-Oliver Inc. His personal inventions include sedimentation and classification devices now accepted as basic processing tools. Now 89, Dr. Dorr is still active in the affairs of The Dorr Foundation and Dorr Associates, Inc., and is a director of American Synthanite Corp.

Integral tube coolers for lightweight aggregate

Application of integral tube coolers will commence in the lightweight aggregate field in the Material Service Div. expanded shale producing facilities at Ottawa, Ill. An Allis-Chalmers 11¼ x 200-ft. kiln with ten 4½-ft. diam. x 20-ft. long tube coolers will be installed. The kiln will

be fabricated from an existing 120-ft. rotary dryer and a new 80-ft. section. The integral tube coolers will increase efficiency and conserve space. Erection and construction costs will be lower as no supporting piers are needed.

Railroad-truck duplex scales for Marquette Cement Co.

Seven railroad track scales (duplex models capable of weighing trucks) and one motor truck scale made up an order received by Fairbanks, Morse & Co. from Marquette Cement Mfg. Co. "Duplex scales are particularly valuable in the cement industry as the road-building program gets rolling," C. G. Gehringer, director of marketing of the Fairbanks, Morse Scale Div., said.

To permit easy access for trucks, each railroad scale will have its concrete deck built with the top flush with the top of the rails. They will feature automatic conversion of net weight into barrels. These scales are 70 ft. long by 12½ ft. wide.

Dayco sells tire div.

The Board of Directors of Dayco Corp., Dayton, Ohio, have approved the sale of the tire division to the Firestone Tire & Rubber Co. A. L. Freedlander, chairman of the board and chief executive officer of Dayco Corp. emphasized, "the sale is solely of the tire division and in no way affects our other 10 manufacturing plants, our other subsidiaries and divisions and our foreign technical agreements. Further, our program of diversification and new products is being intensified." This sale will place the company in a still stronger financial position and will enable the company to replace the tire division's volume with more profitable sales.

Please turn to page 184



32nd ANNUAL
CONVENTION



46th ANNUAL
CONVENTION

ALL
UNDER ONE ROOF

COMBINED

Biennial Show

AT NEW McCORMICK PLACE • CHICAGO



TIME: February 5-8, 1962 • PLACE: One of the world's biggest, finest exposition centers.



- **ACRES OF NEW IDEAS.** More than 160 blue ribbon exhibitors. New equipment . . . new methods . . . new ideas. All to help you cut costs . . . increase efficiency and profits.
- **FREE TIME TO SEE SHOW.** No convention meetings all day Monday . . . or Tuesday and Wednesday afternoons. Plenty of time to see all exhibits, exchange ideas.
- **FREE, FAST TRANSPORTATION** between Conrad Hilton and McCormick Place. Buses scheduled every three minutes during rush hours. Every ten minutes throughout day.
- **EXCELLENT DINING FACILITIES.** No need to go out to eat. McCormick Place has three restaurants, one cafeteria. All large and modern. Prompt service, excellent food.
- **REGISTRATION AND ADMISSION ARE FREE** to users as well as producers of sand, gravel or ready mixed concrete.

PLAN NOW TO SEE THIS GREAT COMBINED INDUSTRIES SHOW

Manufacturers News

continued from page 182

Clark essay contest

"Cost Reduction Through Materials Handling" will be the theme of the ninth annual essay contest sponsored by the Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich. The 1961 contest, sponsored by Clark and conducted by the American Material Handling So-

ciety, will have a first prize of \$2,000 and 9 other prizes totaling \$3,000 for the best papers submitted on the subject. The contest which closes April 1, 1962, is open to anyone associated with materials handling except Clark employees and dealers. Papers will be judged on analysis of subject, value in the field,

originality, organization of material and use of visual aids.

In their papers, contestants should discuss one or more unsolved materials handling problems within industry or government, and propose one or more solutions for cost reduction. Problems anticipated in the future or existing problems yet unsolved may be discussed.

NEW! EAGLE'S ROLL CRUSHER

This extra-rugged roll crusher by Eagle Crusher Company is one of the many reliable products in the Eagle Line, which includes jaw and roll crushers, portable crushing plants, cage and hammermills, conveyors, loaders.

The Eagle Roll Crusher shown below has roller bearings throughout. All steel gears running in oil.

Two sizes . . . 24 x 20, 30 x 24.

You are invited to consult with our engineers about your own particular problems. Eagle Crusher engineers have a rich backlog of experience to draw on when making equipment recommendations for your operations. Write today . . . tell us your problem. We'll be glad to help. No obligation.



JAW AND ROLL CRUSHERS, PORTABLE PLANTS,
CAGE AND HAMMERMILLS, CONVEYORS, LOADERS

EAGLE

CRUSHER CO., Inc. GALION, OHIO-U.S.A.

Enter 1245 on Reader Card

Mutual support agreement

An agreement of mutual support in the engineering and marketing of automated control systems and processes has been announced by Allis-Chalmers, Consolidated Systems Corp., and International Business Machines Corp. The three companies will work together when it is in the best interest of the customer to have a coordinated system, officials of the firms said.

A typical integrated system will utilize Allis-Chalmers' basic industrial equipment, Consolidated Systems' special instrumentation and IBM's data processing equipment.

McKee acquires Western Machinery

Arthur G. McKee & Co., international engineering and construction concern, announced it has completed acquisition of Western Machinery Co., San Francisco. McKee stated the acquisition involves the purchase of approximately half of Western Machinery's stock. Western Machinery will issue notes to buy the rest of its stock from holders, and completion of the transaction will give McKee all the outstanding stock.

Western Machinery is now made up of three divisions: The Western Knapp Engineering Div., the WEMCO Div. and the Distribution Group.

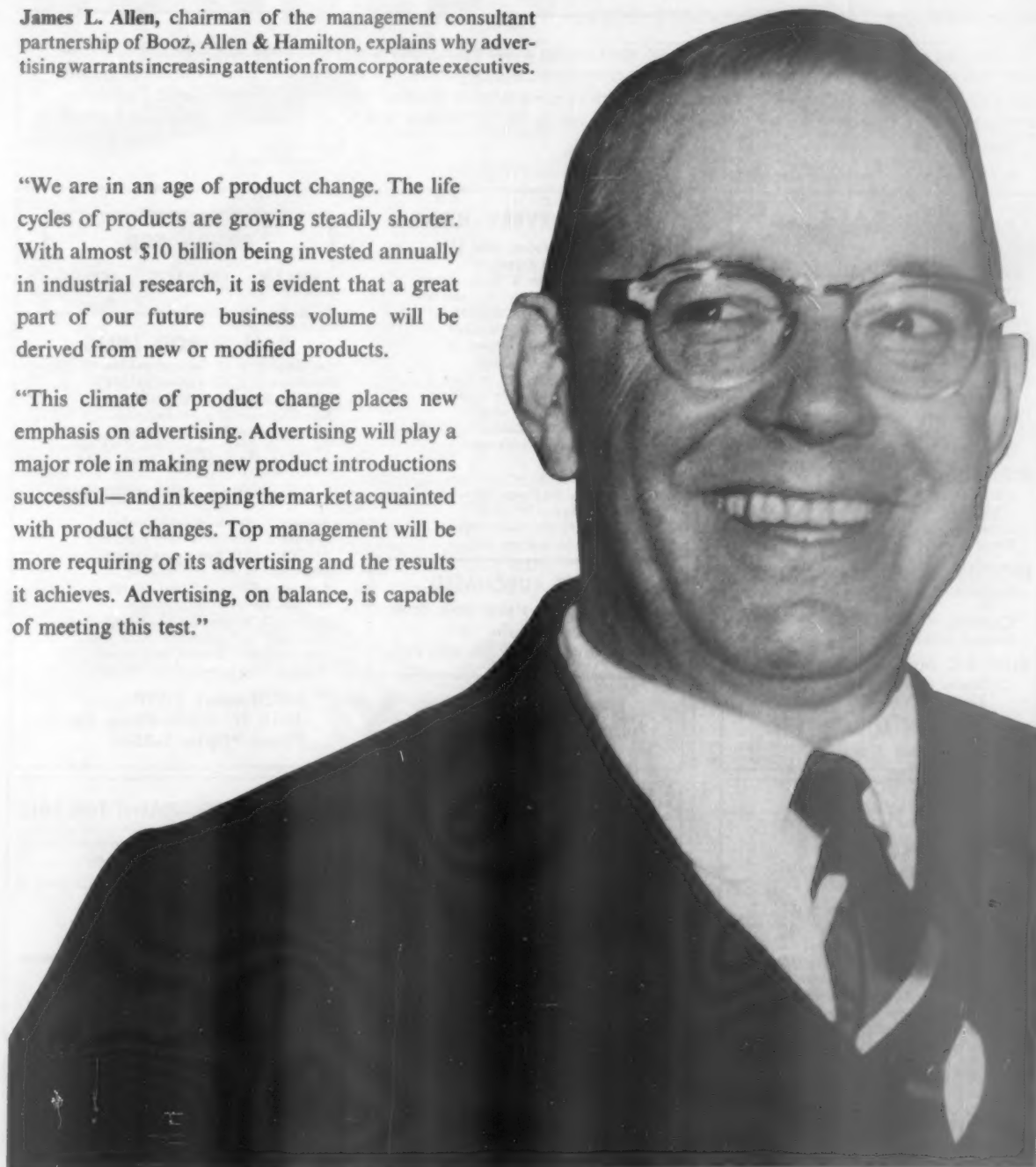
END

"More money for advertising! Why?"

James L. Allen, chairman of the management consultant partnership of Booz, Allen & Hamilton, explains why advertising warrants increasing attention from corporate executives.

"We are in an age of product change. The life cycles of products are growing steadily shorter. With almost \$10 billion being invested annually in industrial research, it is evident that a great part of our future business volume will be derived from new or modified products.

"This climate of product change places new emphasis on advertising. Advertising will play a major role in making new product introductions successful—and in keeping the market acquainted with product changes. Top management will be more requiring of its advertising and the results it achieves. Advertising, on balance, is capable of meeting this test."



ASSOCIATION OF INDUSTRIAL ADVERTISERS

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An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PHOENIX, PITTSBURGH, PORTLAND, ROCHESTER, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., TULSA, YOUNGSTOWN.

WHERE TO BUY

You may find just what you're looking for in the used equipment, employment and professional advertisements below. Box numbers are confidential and advertisers' names will not be disclosed. Send replies to: Box Number (shown on ad), c/o ROCK PRODUCTS, 79 W. Monroe St., Chicago 3, Ill. All replies will be forwarded to advertisers daily.

FOR SALE

CRUSHERS

Penna. CF3-38 Reversible Impactor
Stedman 36" Single Cage Mill
Telsmith 36" Standard Gyro-sphere
Farrell-New Ecc. Shaft for 42" Jaw

CRANES & SHOVELS

Michigan TMCT-16 Truck Cranes 25' Boom
Lorain 75 Stick & Bucket 1 1/4 Yd
Northwest Hoist Drum Laggings 1" for 80D
Haiss AB1XE 2 Yd Clam Shell

SCREENS

Allis-Chalmers 5 x 12 Low Head Single Deck with Stop Deck Pockets
Telsmith 3 x 10 Triple Deck
Rotex Sifter 5 x 7 Single Deck

MISCELLANEOUS

Hoffman Vacuum Cleaners 7 1/2 & 10 HP

Chambers Pug Mill 28" x 14"
Hughes Double Drop Deck Semi-Trailer

ELECTRIC MOTORS

25 Sleeve Bearing Squirrel Cage 440/3/60 3 HP to 75 HP

G. & W. H. CORSON, INC.

Plymouth Meeting, Pa.

ROT. DRYERS—KILNS

10' x 11' x 175' Vulcan Kiln, 1 1/2"
10' x 78' National dryers, 3/4"
8'-6" x 70' Bartlett & Snow dryers
8' x 80' Traylor dryer, 3/4" welded.
8' x 60' rotary kiln, 1/2" welded
8' x 60' Davenport, 1 1/2" welded
8' x 40' Stearns-Roger dryers, 1/2"
7'-6" x 62' kiln, 1/2" welded
7' x 120' Allis kiln, 3/4" welded
7' x 110' Bonnet kilns, 3/4" shell.
6' x 7' x 100' kiln, 1/2" shell
6' x 150' kiln, 3/4" welded
6' x 50' Louisville steam-tube
6' x 50' rot. dryer, 3/4".
6' x 40' rot. cooler, 3/4"
6' x 25' Louisville steam-tube
4'-9" x 32' dryers, 3/4" shell
4'-6" x 40' Ruggles-Coles dryer
3' x 23' Standard dryer, 3/4"

JUST PURCHASED

1—2' Symons standard cone
1—6' x 150' kiln, 3/4"
1—Raymond 66" hi-side mill

PERRY

PERRY FOR KILNS - DRYERS - MILLS

BALL & ROD MILLS

Hardinge 8' x 48" conical pebble, 75 HP
Hardinge 7' x 36" conical pebble
Allis-Chalmers 6' x 18" pebble-tube
Allis-Chalmers 6' x 16" ball-tube
Allis-Chalmers 5' x 22" ball-tube
Bonnet 3' x 10' ball-rod mill 75 HP.
Denver 4' x 10' rod mill, 60 HP.

CRUSHERS—PULVERIZERS

Symons 2' standard cone crusher
Symons 2' shorthead cone crusher
Allis-Ch. #322 hydracone crusher.
Farrel 36" x 15" jaw crusher
Buchanan 24" x 13" jaw, 50 HP
Mitchell 18" x 9" jaw, 25 HP
Babcock & Wilcox #32E ball type pulv.
Raymond 66" 6-roller hi-side mill.
Raymond 50", 5-roller, hi-side mill
Dixie #5060 hammermill, 500 HP

EQUIPMENT CORP.
1418 N. Sixth—Phila. Pa.
Phone POplar 3-3505



**ROCK
PRODUCTS
EQPT. DIV.**

8' x 60' x 1/2" Welded Rotary Kiln
6' x 120' x 1/2" Vulcan Rotary Kiln
4' x 35' Rotary Dryer New Shell
4' x 47' x 3/4" Mosser Rotary Dryer
6' x 25'; 6' x 50' Louisville Rotary Dryers
8' x 11' Traylor Ball Mill Steel Lined
#5060 Dixie Mogul Hammermill
SX13 Penna. Hammermills, 400 HP
Neil Patterson Crushers, 100 HP
Raymond #50 & #40 Impact Mills
36" x 42" Koppers 2 Roll Crushers
36" x 48"; 20" x 6" Jaw Crushers
3'x3'x12' Horiz.; 4'x9'x12' Vert. Puggers
27" x 24" Komarek-Greaves Brig. Presses
30"x96"; 40"x84"; 60"x84" Screens
535"—24" Troughing Belt Conveyor
Bucket Elevators 45' to 90' Centers
Sweco Separator 48" 3—SS Screens
10 Ton Gas/Elec. Locomotive 36" ga.

WRITE—WIRE—PHONE

HEAT & POWER CO. INC.

60 E. 42 St. New York 17, N.Y.
MU 7-5280

ELEC. AIR COMPRESSORS

695' Chgo. Pneu YCB-100 HP 220/440 V.
6—Inger Rand, 1350, 2200, 3000 & 3800
DIESEL LOCOMOTIVES, CRANES & CARS
18—115, 100, 80, 70, 65, 45, 25, 20, 10 & 8 ton GE & GM & Plymouth Diesel Locomotives
500—50 & 70 ton Gondola & Box Cars
500—50 & 70 ton Ore Cars
25 ton Amer. Diesel Loco Crane
40—20 & 30 yd Air Dump Cars
ROTARY DRYERS & KILNS
6' x 48", 6' x 72", 8' x 60", 9' x 160", 10' x 78"
7' x 110' Rotary Kilns
REDUCTION MILLS & FEEDERS, CRUSHERS
18V-Pioneer Portable Diesel Crusher
40 x 33 Cedar Rapids Hammermill
2020 & 3645 Double Impact Breakers
15 x 24 Cedar Rapids Port. Crusher
3' x 12", 4' x 8, 4' x 12 & 6 x 16 Vib. Screens
1", 3", 4", 5 1/2" & 7" Symons Cones
5' x 5' & AC Ball Mill w/motor
5' x 10", 6' x 12" & 7' x 15" Rod Mills
2—KVS 5' x 8" Ball Tube Mills Air Swept
636 Allis Ch. Hydracone Crusher
4' 0" Traylor Type TV-Gyratory
4' Symons Std. Coarse Bowl 1952
10" x 30", 18" x 36", 13" x 24" Jaw Crushers.
48", 20" Traylor Primary Gyratory Crushers
8" x 10", & 20" x 36" Pioneer Jaw Crushers
2A Cedar Rapids Port. 24 x 16 Roll Crusher
14x28, 12"x26", & 9"x24" Cedar Rapids Jaw
18x36, 30"x42", 48"x60", & 66"x84" Jaw
Crushers
46" Stedman Double Cage Disintegrator
24" x 14" Allis Chalmers Type B Double Ball
Bradley Hercules Mills (3) Type 6000
PSS Syntrol Grizzly Feeder
6—30" x 32" Ding's Magnetic Head Pulleys
3—200 HP & 160 HPSD Ottumwa Elec. Hoists.
ELEC. WHIRLEY CRANES
2 Amer. R20-60 Gentry 139' Boom
WANT KILNS—DRYERS—CRUSHERS
R. C. STANHOPE, INC.
60 E. 42nd St., N.Y. 17, N.Y.
TEL. MU 3-5075 & 3-1888

MODERN EQUIPMENT FOR SALE

15 H.P. Motor-Reducer Conveyor Drives.
50 H.P. Gearmotors 100 R.P.M.
2 to 10 H.P. Gear motors.
Reducers up to 250 H.P.
Carpullers—3, 5 & 7 1/2 H.P.
24" to 36" Used Belt.
14" to 48" Used Idlers.
Sturtevant #1 & 1 1/2 Rotary Crushers.
Champion #5 Jaw Crusher 12 x 26.
Cedar Rapids Jaw Crusher 9 x 24.
New England Jaw Crusher 14 x 28.
Good Roads Jaw Crusher 10 x 30 R.B.
Good Roads Jaw Crusher 5 x 12.
Acme Jaw Crusher 14 x 26 Steel Frame.
Denver Lab. Jaw Crusher 3 1/4" x 4 1/2".
Farrel Jaw Crusher 36 x 18.
Farrel Jaw Crusher 24 x 13B.
Farrel Lab. Jaw Crusher 6" x 2".
New Holland Plate Feeder 24" x 60".
Jeffrey-Traylor #4 Vibrating Feeder with
Controller.
9" Screw Conveyor Complete with Ends,
Hangers, Gearmotors (250' avail.)
Robins Vibrex Screen 4' x 6'.
Niagara Single Deck Screen 4' x 14'.

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136 Coit Street Irvington 11, N. J.
Essex 3-8105

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MANUFACTURERS OF QUALITY EQUIPMENT
Check our **BARGAINS BELOW**
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BONDED® TROUGHING IDLER CONVEYOR BARGAINS



3" Jr. I Beam
Frame Conveyors



Truss Frame
Conveyors

Built Like
A Bridge
For High Tonnages
Clears Spans to 50 Ft.—
Any Length—Any Belt
Width

Complete Pre-Fab sections of 3" Jr. I-beam Frame and 30" Deep Truss Frame Conveyors which are manufactured for quick and easy assembly on the job site. Equipped with 5" diameter troughing idlers and return rolls, 30" diameter head pulley and 10" diameter tail pulley.

Prices include conveyor complete with 4-ply, 28 oz. duck MAJOR BRAND belt with 1/4" x 1/32" rubber covers. Other lengths priced on request.

WRITE FOR BULLETIN No. 1138 and No. 1189.

Belt Width	Conveyor Length	I-Beam Frame Price	Truss Frame Price
14"	25'	\$ 788	\$ 965
14"	50'	1181	1510
14"	85'	1763	2273
16"	20'	769	975
16"	45'	1125	1434
16"	60'	1384	1779
16"	90'	1897	2443
16"	150'	2923	3785
18"	25'	830	1104
18"	45'	1190	1573
18"	70'	1641	2150
18"	100'	2183	2863
18"	150'	3223	4145
18"	165'	3354	4385
20"	25'	871	1170
20"	60'	1546	2016
20"	75'	1836	2358
20"	90'	2135	2769
20"	135'	2993	3874
24"	25'	922	1300
24"	45'	1335	1722
24"	70'	1852	2377
24"	100'	2472	3160
24"	120'	2886	3683
24"	150'	3507	4487
24"	170'	3929	4999
30"	50'	1591	2018
30"	70'	2054	2694
30"	90'	2518	3170
30"	100'	2749	3450
36"	25'	1745	1393
36"	45'	2613	2094
36"	60'	2913	2497
36"	100'	3648	3758

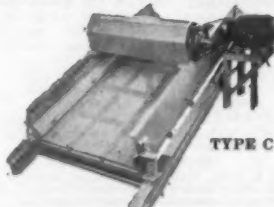
BONDED® HEAVY DUTY MOBILE CONVEYORS

- FAST ECONOMICAL HANDLING OF BULK MATERIAL
- AVAILABLE WITH SCREEN AND FEEDER
- RUGGED 30" DEEP TRUSS FRAME
- HIGH TONNAGE AT LOW COST
- EQUIPPED WITH TOW HITCH



The economical solution to the need for a heavy duty conveyor that can be readily moved from one job-site to another. Available with most or mastless type undercarriage and hydraulic powered mechanism. All standard conveyor accessories can be used. Lengths to 60 feet and belt widths through 30 inches. Write for catalogue.

BONDED® SPECIAL SERVICE AND HEAVY DUTY VIBRATING SCREENS



TYPE C

WRITE FOR BULLETIN #1224

For scalping middle-range pieces and accurate sizing of fines where quantity and feed do not warrant a larger capacity, heavy duty model. Medium to heavy construction. Can also be suspended from four steel cables and springs for portable or temporary installation. Vibration remains in working screen body. No shaking of tippie, building or platform.

Prices from\$487

WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN CAT. 1086



TYPE B

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing, positive throw eccentric shaft: 3' x 6" to 5' x 14". 1 to 6 decks. WRITE FOR BULLETIN No. 1087 and "9 REASONS WHY BONDED IS YOUR BEST BUY."

For high tonnages, heavy scalping and multiple sizing of minerals and industrial products. No dead spots. Springless live-rubber mounting of screen body controls vibration. Screen cloth and plate in all models reversible for longer life. PRICED FROM\$1620

TESTED CONVEYOR BELTING

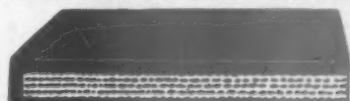
WE PAY FREIGHT ON 200 POUNDS AND OVER.

QUANTITY DISCOUNTS ON 150' AND OVER

All belting is tested by the Engineering Laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & CAT. #1279



MAJOR BRAND: 12# to 18# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty. 28 oz. duck. 1/4" top x 1/8" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	U. S. Made Per Foot
14"	4	\$5.86
16"	4	5.21
18"	4	5.56
20"	4	4.11
24"	4	4.61
30"	4	5.64
36"	4	6.69

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Shim Coat Between Plies. A high grade of heavy duty, 28 oz. duck with 1/4" top x 1/8" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	U.S. Made Per Foot	Imported Belt Per Foot
14"	4	\$3.51	\$3.17
16"	4	2.74	2.56
18"	4	3.14	2.73
20"	4	4.72	4.32
24"	4	5.35	4.86
30"	4	6.56	5.98
36"	4	7.95	6.95
24"	5	6.25	5.63

The Following Have 1/4" Top Rubber Cover x 1/8" Bottom Rubber Cover:

Width	Ply	Price Per Foot
12"	3	\$2.41
18"	3	3.23
24"	3	4.24

WRITE US FOR YOUR CHUTE LINING REQUIREMENTS.

CHUTE LINING is of high-tensile, abrasion-resisting quality. Recommended for Chute and Launder Lining, Conveyor Belt Scrapers, Conveyor Skirt Boards, Die-Press or Bumper Skirt Hoppers, Bins and other metal surfaces exposed to the action of abrasion materials.

BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY



3-roll, 5" diameter Troughing Idlers for:			
14" belt	\$19.75	24" belt	\$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	23.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:			
14" belt	\$ 8.50	24" belt	\$11.50
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. WRITE FOR BULLETIN #1188.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186

WRITE FOR FREE CATALOG AND PRICES

PHONE Evenings: AX. 1-2213 or Belmont 7-7728

128 Bellevue

Mfrs. of Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators COLUMBUS 7, OHIO

WE OWN THE EQUIPMENT

WE ADVERTISE

QUARRY EQUIPMENT

Cedarapids 4A 3546 primary
Cedarapids 2B 1535 scalper
Cedarapids 3C 4024 secondary
Telmith 2536 Primary Crushing Plant
Pioneer 100W Washing & Screening Plant
Cedarapids 23 Kuhl Breaker, Rebuilt.
Cedarapids 1036 plain bearing jaw
Farrell 8 1/2, 12 x 24 Blake type jaw
Telmith 400 secondary gyratory
Kennedy 27 1/2 Gairnes Gyratory, New Condition
Cedarapids 3033 Hammermill, Rebuilt.
Cedarapids 4024 Roll Crusher, Reconditioned
3-150KVA, 240-480 V. generator sets, Murphy power
Cedarapids 16' open inclined bucket elevator
Telmith Pulator, 4' x 12', 3-deck screen.
Telmith Vibro-King, 4' x 12', 3-deck screen.
Cedarapids 5' x 12', 3-deck-Riprap screen
Cedarapids 4' x 14', 3-deck screen.
Cedarapids 40' x 12' 1/2" apron feeder.
Cedarapids 43' x 16' Apron Feeder.
3-Syntron F-44 Vibratory Feeders
Eagle 20' x 25' Washer Classifier—Dehrdrator
Cedarapids 20-6, 3-comp. charging hopper.
Smithco 10-Yd. Portable Charging Bin
8' x 12', 8' x 18', 15' x 23' bins in stock
18', 24', 30', 36' conveyors & belting

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Lorain L-26, 9 1/2-yd. Diesel Backhoe
Lorain TL-20, 15-yd. Gas Shovel or Hoe
Lorain SP-434, 23 1/2-ton Self-Propelled Crane
Lorain MC-414, 20-ton Moto-Crane
Lorain MC-354, 15-ton Moto-Crane
Lorain SP-110, 10-ton Self-Propelled Crane
Lorain TL-30-MC, Moto-Crane

TRUCKS, TRACTORS, SCRAPERS

Bucild 49FD, 15-Ton Rear Dump.
Bucild 13-yd. Bottom Dumps, Good. (2)
Bucild TC-12 Twin Engine Tractor
Caterpillar D-7 with Hydraulic Angledoor
Caterpillar D-4 Tractor Only

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Gardner-Denver DH122J Air Trac Drill, Rebuilt
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FH122J Drill, New Cond.
Bucyrus-Erie 22W Well Drill, Trk Mtd.

AIR COMPRESSORS—PORTABLE

Gardner-Denver 600' Rotary Diesel
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Chicago Pneumatic 315' Air-Cooled Diesel, Recond.
3-Gardner-Denver 125' Rotary Gas
Ingersoll Rand 105' Air-Cooled Gas
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Leflo 105' Tractair with Doser, Backhoe, Shovel

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Camp Hill, Pa.

Phone Harrisburg REgent 7-3431

3-10'x78" Dryers—2'3'4'5'1'7' Symons and Tel-smith Cone Crushers—3648-4042-4872 Jaw Crushers and smaller sizes—48" & 20" Gyratory Vibrating Feeders—other types of Feeders—Eagle Fine & Coarse Material Washers—Dixie Non Clog moving plate Hammermills—Asphalt Plants—Jaw—Cone—Gyratory—Roll Double and Triple—Hammermill and Impact Crushers—Ball—Rod—Tube Mills—Screening, Washing and Crushing Plants, Classifiers Compressors, Conveyors, Cranes, Drills, Dump Cars, Dredges, Feeders, Hoists, Motors, Generators, Kilns, Dryers, Locomotives, Pumps, Screens, Shovels, Draglines, Transformers, Euclid Trucks.

STANLEY B. TROYER EQUIPMENT CO.

Phone 546-6427
546-5954 Box 97, Crosby, Minn.

IOWA portable crusher, 1036 jaw 3018 roll 4214 screen delivery return conveyor Cat 13000 PV chain & sprocket drive less 8 920 tires. Jaw roll PV good, balance working. Priced to move no trades \$16500.

J. D. EVANS EQUIPMENT CO.

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LIMESTONE MINE LIQUIDATION SALE

- Air Compressors
- Air Receiver Tanks
- Belting
- Belt Conveyors
- Cone Crusher
- Roll Crusher
- Air Drills
- Electric Shovels
- Ventilating Fan
- 15 Ton Electric Locomotives
- 8 Ton Electric Locomotives
- 8 1/2 Ton Mine Cars
- Motor Generators
- 2" to 6" Pipe
- Centrifugal Pumps
- 20 Ton Scales
- Vibrating Screens
- 40# & 60# Rail
- Steel Ties (36" gauge)
- Wire, Cable, Trolley

All of the above facilities and many more valuable items from Michigan Limestone Division of U. S. Steel Corp'n's Kaylor, Penna. Mines #3 & #4 now being offered.

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LAkeview 6-4151

PRICED FOR QUICK DISPOSAL

3 Allis Chalmers (2 compartment) 7'x22' Compeb Mills with Mechanite liners; each directly coupled to 400 H.P. Motor.

1 Allis Chalmers 9'6" Continuous Bell Mill; or PRELIMINATOR with Mechanite liner; directly coupled to 400 H.P. Motor.

3 Allis Chalmers 7'x22' Continuous Tube Mills; with three 14' Raymond Double Whizzer Air Classifiers; each mill directly coupled to a 400 H.P. 3/60/2200 V 180 RPM Motor.

3 Raymond 14' Mechanical Air Separators with Double Whizzers, new in 1950. Each Separator V-Belted to a 75 H.P. Motor.

All Mills and Classifiers were operated in CLOSED CIRCUIT.

Also available are Steel Enclosed Bucket Elevators and Screw Conveyors.

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FOR SALE

25 Yard BUCYRUS-ERIE

Electric DRAGLINE

WILLIAM LUBRECHT, III

CONSTRUCTION EQUIPMENT

311 W. Diamond Ave. Hazleton, Penna.
Telephone Gladstone 5-4041 or 5-0253

SAUERMAN 2 1/2 Cy. Dragscraper, 2-drum roller brg. Hoist, bucket, mast, five blocks, 125 hp. dustproof motor. Good. \$8000.
DIAMOND 77 Portable Gravel Plant w/1036 Jaw, feeder, 36x24 roll, 4x12 screen, rotator, conveyors, 6-110 GM diesel, tandem rubber, 5 yrs. old. \$18,500
UNIVERSAL 293Q Portable Plant w/1824 Jaw, feeder, 3020 hammermill, 3x10 screen, rotator, power, tandem rubber. \$12,500
CEDARAPIDS 1824 Jaw Portable w/feeder, conveyor, power, tandem rubber. 90% new. \$10,500 Carlsbad, N. M.
JAW CRUSHERS: Diamond 2036 rb., good. \$4500 Pioneer 2036 rb., late mdl. \$4500 Rogers 1824 rb. excellent. \$2750
VIBRATING SCREENS: Simplicity 3x10 2-deck, excellent. \$1000 Simplicity 4x12 2-deck excellent. \$1750 Cedarapids 3x8 2-deck flat, good. \$1150 Cedarapids 3 1/2 x10 2-deck flat, good. \$1500 Cedarapids 4x8 3-deck, inclined. \$1000 Seco 5x8 3-deck, good. \$1350 Diamond 4x10 2-deck, good. \$1150
ELECTRIC SHOVELS, Bucyrus 120B w/6 cy. bucket, just rebuilt. \$37,500 Bucyrus 54B, new 1951, just rebuilt. \$26,500 Marion 43M tunnel shovel, new 1950, good. \$11,000
SHOVEL FRONTS for P&H 655 B, complete w/deck mchy., new. \$3750 N.W. w/deck mchy., like new. \$3750 Lima 34 chain crowd, \$500 P&H 255A, good. \$750 Unit 1020, like new. \$750
COMPRESSORS: Ingersoll 600 Rotary portable w/671 GM diesel, good. \$5500 Jaeger 315 cfm portable diesel, rebuilt. \$300 mo. \$2850 Davy 210 cfm portable diesel rebuilt. \$250 mo. \$2250
SCHRAMM ROTO DRILL #TRDR-55 w/125' compressor on International FAR300 Tractor, like new, 1/3rd price. \$7500
PORTABLE SURGE BINS, Cedarapids 5 cy. w/30" belt, motor, on rubber. \$2350 Also shopmade unit \$1350
WENZEL MACHY. CO.
565 S. 10th, Kansas City, Kans. Mayfair 11710

JAW CRUSHERS

60"x48" to 6"x3"

New and used RELIABLE



"Farrel-Bacon"
Jaw Crushers

BACON-PIETSCH CO., INC.

26 Park St., Montclair, N.J.

29 Washington Ave., Hamden, Conn.
Phone Montclair—Pi 6-1300



AAA LIQUIDATION SALE RINGWOOD MINE

RINGWOOD, NEW JERSEY

AIR COMPRESSORS

- 2—1 R. Type XRE, 1500 CFM, 300 HP with controls.
- 4—Westinghouse Type 4-YC, 7½ HP with controls.
- 1—CP Model D880, Portable, Diesel Engine, 315 CFM.
- 1—Worthington Type HXE, Portable Gas Engine, 315 CFM.

BALL MILL

- 1—Hardinge 8' x 22", 150 HP with controls, 4 Ton of 3" Balls and Parts.

BELT CONVEYORS

- Will sell components as follows:
- 500—Trough Idlers 20", 24", 30" and 36" all 6" Dia.
- 200—Return Idlers 20", 24", 30" and 36" all 6" Dia.
- 4000—Belting 4-5 and 6 ply 20", 24", 30" and 36"
- 20—Head Pulleys for above Belts 24" and 30" Dia.
- 20—Tail Pulleys for above Belts 20" and 24" Dia.
- 20—U. S. Syncro and Link Belt Drives 3, 5, 10, and 20 HP.
- 2—"Transportometers," for 24" & 30" Belts. 80G/120 TPH at 200 FPM.
- 1—Rex Belt Tripper, Automatic and Reversing 24".

BELT CONVEYORS MAGNETIC

- 1—36" x 25' with Dings 36" x 32" Pulley
- 4—30" x 8' with Dings 42" x 30" Cobber Pulley
- 8—36" x 14' with Dings 42" x 36" Crockett Separator, Stainless Steel incased, filled with oil, type AHM.

BUCKETS—GRAB & SCRAPER

- 1—Blaw-Knox, Size 736, Cap. 3½ Cu. Yd.
- 1—Blaw-Knox, Size 734, Cap. 3 Cu. Yd.
- 2—Amco 48" Scraper.
- 3—Amco 36" Scraper.
- 1—Amco 60" Scraper (Unused).
- 1—Koehring Dipper, ¾ Yd., with arms for No. 304 Shovel (Unused).

CABLE & WIRE (Unused)

- 2—Rolls—Bethlehem 1½" Dia., 6 x 21, #200' each roll.
- 2—Rolls—Anconda #2/0 trolley wire 6000'.
- 1—Roll—Bethlehem ¾" Dia., 6 x 19, 500'
- 1—Roll—G.E., 3 Conductor, lead covered, 500'.

CARS—MINE

- 15—Granby—94 Cu. Ft., side dump (Unused)
- 15—Granby—75 Cu. Ft., side dump.

CLASSIFIERS

- 3—Dorr Duplex 4' x 25', Type DSHF.

CRANES

- 1—Euclid 20 Ton Cap. 30' Span, 45' Lift, 3-Motor, AC Voltage, Modern.
- 1—Link Belt Crawler, 1½ Yd., Clam Bucket, Ser. 1837.

CRUSHERS

- 1—Telsmith Model 10-B, 1¼" openings, Cap. 38 to 44 TPH, 30 HP, Ser. 1504.
- 1—Birdsboro Buchanan, Type C, Jaw, Size 30" x 42", 100 HP, Ser. 1092.

**LIQUIDATION
OFFICE:**

AAA Machinery & Equipment Co.

MINING MACHINERY DIVISION - P. O. BOX 158

PHONE: York 2-7028 RINGWOOD, NEW JERSEY

JUST A 50 MINUTE DRIVE FROM NEW YORK CITY

- 1—AJO—Taylor 60" Dia. x 18", 2—100 HP with Controls.
- 1—Penn. 24" x 24", Single Roll.
- 1—Symons, 4' Short Head Cone crusher, Course Bowl. 125 HP Motor.

DRILLS—DRIFTER—STOPEHAMMER—GRINDERS

- 2—IR, DA—35, on 9' shells.
- 14—IR, DA—35 on 4' shells.
- 6—IR, JA—55 Jack Hammers.
- 6—IR, JR—38 Jack Hammers.
- 23—IR, P—48 Stopehammers.
- 1—IR, Size JA—3, Air Grinder for Bits.

DUST COLLECTOR

- 1—AAF "Roto-Clone" No. 36" Type W, 30,000 CFM, 75 HP with Controls.

HOISTS

- 1—Nordberg—Double Drum, 6' Dia. x 66" Face. 1000 RPM of 16,000 lbs. line pull drum, Cap. 4—450 1½" cable. 500 HP 3-60-2300 Volts. All controls.
- 1—Belmont Double Drum. 300 HP-3-60-2300 Volts. All controls.
- 1—Lidgerwood, single drum, 8' Dia. x 4' Face. G.E. 150 HP.
- 1—Link Belt Slope Hoist. Side D-20. 48" x 48" Drum. 700' 1" Cable.

HYDRO—SEPARATORS

- 2—Dorr, Type A, 8' x 4' Deep. 1½ HP, S/N 7861, 7860.

HOISTS & SLUSHERS—AIR

- 6—IR, Model EUA, 1000 lbs. cap.
- 1—Joy Double Drum, Model EP113-33, 50 HP.
- 3—Job Double Drum, Model EP 113-38, 30 HP.
- 2—Joy Double Drum, Model EP 110-115, 15 HP.
- 1—Joy Triple Drum, 30 HP.

LABORATORY EQUIPMENT

- 1—Sturtevant Jaw Crusher, Size 6" x 1½" opening.
- 1—Sturtevant Roll Crusher, Size 5" x 4".
- 1—Sturtevant #339 Disc Grinder, 10" dia.
- 1—Lot of Miscellaneous, comprising complete lab. Tables, Glassware, Scales, Furnaces, etc.

LOCOMOTIVES

- 2—G.E. Diesel Electrics, 60 Ton, 425 HP, Cooper-Bessemer Engine. S/N 13142 and 15091.
- 4—G.E. Electric Mine Type, Model IME2C4-A6, 4 ton Cap. 36 Gauge.

MACHINE SHOP EQUIPMENT

- 1—Toledo 2" High Speed Pipe Threader and Cutter.
- 1—Williams 6" Pipe Threader & Cutter.
- 1—Acme Bolt Threader, Model BB-2793.
- 1—Saunders Threader & Cutter.
- 1—Shumaker Lathe, 34" x 12'.
- 3—Wilson Arc Welders, 250 and 400 AMPS.
- 1—Aurora Drill Press.

MISCELLANEOUS

- 1—Crocker Wheeler 50 KWMG Set 75 HP.
- 1—G.E., 6 KWMG Set, 10 HP.
- 1—Emco Mucking Machine No. 21. 36 Gauge.
- 1—Broughton Mixer, 24" L x 48" W x 28" D.
- 1—Large Lot of miscellaneous supply items. Valves, pipe, drill bits, cable, wire, sheaves,

bearings, starters, etc. Approximately \$50,000 replacement inventory including spare parts. (All unused).

PUMPS—CENTRIFUGAL

- 3—IR Model 1½ CNT6, 200 GPM, 75 Hp.
- 2—IR Model A, 300 GPM, 230' Head, 30 Hp.
- 2—IR Model A, 200 GPM, 430' Head, 40 Hp.
- 1—IR Model A, 200 GPM, 230' Head, 20 Hp.
- 1—IR Model B, 50 GPM, 130' Head, 3 Hp.
- 1—Deming Deep Well. 8 Stage, Figure 4700, No. 12, 100 Hp.
- 1—Deming, 8" 2500 GPM, 160' Head, 150 Hp.
- 1—Worthington, 8", 2500 GPM, 160' Head, 150 Hp.
- 2—Worthington, Model 5-LG-1, 8", 100 Hp.
- 1—Worthington, 4-Stage, 35 Hp.

PUMPS—SAND

- 2—Wiffley, 1" Model CA, 5 Hp.
- 2—Wiffley, 2" Model CA, 7½ Hp.
- 7—Wiffley, 3" Model CA, 20, 25, 30, & 40 Hp.
- 3—Wiffley, 4" Model CA, 20, 25, & 30 Hp.
- 1—Wiffley, 8" Model CA, 100 Hp.
- 1—Linatex, 3" Model M., 200 GPM, 40' Head.

RAILROAD TRACK

- 1500 Tons—80, 90 & 100 lb. relaying rails. Including all accessories.

SCREENS—VIBRATING

- 3—Tyler "Ty-Rocks" 5' x 12', Double Deck, type 600, with Fines Hoppers, 10 Hp.
- 7—Tyler "Hummers", 4' x 5', Type 38, Single Deck, wet or dry.
- 1—Tyler "Hummer" 4' x 6', Single Deck.
- 1—Tyler "Hummer" 3' x 5', Single Deck.
- 1—Tyler "Hummer", 2' x 4', Single Deck.

SIZER

- 1—Dorr Fahrenwald, Type EX-8, 8—Pocket, S/N U57864.

TABLES CONCENTRATING

- 8—Deister Triplex—Plateau Deck—4RH, and 4LH, Intermediate. 2 Hp.
- 16—Deister Simplex—Plateau Deck—4RH, and 4LH Coarse, 2 Hp.

THICKENERS

- 2—Dorr 30' Dia. Type AX Mechanism.
- 1—Dorr 80' Dia. S/N 457865.

TRANSFORMERS

- 2—Wagner, 1500 KVA, 33,000/2300 Volts.
- 1—Westinghouse, 300 KVA, 2400/480 Volts.
- 2—Allis Chalmers, 200 KVA, 2400/480 Volts.
- 3—Westinghouse, 150 KVA 4800/2400, 480/240/120 Volts.
- 3—G.E., 50 KVA 2500/120 Volts.
- 3—Westinghouse, 37.5 KVA, 2200/440 Volts.
- 3—Westinghouse, 37.5 KVA, 2400/240/120 Volts.
- 22—Miscellaneous Transformers. 5-10-15-20 and 25 KVA.

VACUUM FILTER

- 1—Dorr Continuous 10' x 5' Face, 155 Sq. Ft. Filter area, with 40 Hp. vacuum pump, cap. 40 TPH.

WEIGHTOMETER

- 1—Merrick Model "E", 20" Belt. S/N 423.

CONCRETE PLANTS

Johnson 150 ton 3 comp. aggr. cement 1500
Noble CA-104-100 4 comp. 900 CF cement silo
Johnson TY 400-300 yd bin 4 aggr. 1 cement
Koehring mixer, 3 yd bucket.
Erie Strayer 120 tons aggr. bin, 800 bbls. cement
Noble CA-304 4 comp. large capacity. Complete
Smith 84-S 3 yd. Tilt-Mixer, 40 HP AC motor.
Johnson 205, TTI-50, 200 yds; 3 comp. aggr. 500 bbls.

FULLER KINYON CEMENT EQUIPMENT

1-7" conveying system pump Type H3-T Elec.
motor.
1-Type C200 single stage rotary compressor 135
HP. Elec.
1-4" motor operated 3-way directing valve
1-8" Fuller Huron airlift convey. system. Com-
plete.

MILLS—CRUSHERS—KILNS—DRYERS

JAW: Rollman, 14x24, Buchanan 14x20, 20x22,
Type C 20x22, Cedar Rapids 20x20, Traylor 20x20,
20x20, 20x22, Lippman 20x20; Universal 30x22;
Superior McCully 42x40.

GRATOR: Al. Chal. 8, 8K, 10", 16, Gates 12K;
Traylor TS Kennedy Van Buren 37 1/2".
CONE: Symons 3", 4 1/4", 5 1/4", Kue-Ken 30";
Traylor TV4; Telsmith 3", 36".

ROLL: Cedar Rapids 24x16, 53x30; Al. Chal.
27x16, 42x16, Pioneer 40x22, 40x24 triple, 54x24;
Telsmith 40x22; Universal 30x18; Lippman 40x20.

MILLS—ROD—Dawson 4x3, 4x10, Hardinge 4x10;
Macy 2x1, 2x12.

TUBE: Al. Chal. 4x22, Smidth 5 1/2"x20, 6" x 21;
Hardinge 4 1/2"x16 8x18; 8x9; 8x36; 8x48; 10x48.

HAMMERMILLS: Penn SXT-350 HP motor, 63R
10'x17"; Rodman 21x20, 36x22; Cedar Rapids
50-50, 30x33, 20x22 double; Dixie 36x50.

AUTOCLAVES: J&C 6'x25' 8" dia. x 123"
KILNS: 6'x26', 6'x120', 8'x100', 8'x124';
BALL MILLS: 4'x16', 6'x26', 8'x48'

CRUSHING PLANTS

Pioneer Port. 2436 jaw 40x22 twin roll 38"x20" apron
feeder, Murphy Diesel.
Universal 4924 roll port. Diesel. New 1958.
C-B 2236 jaw, Port. double deck grizzly. Diesel
heavy duty feeder.

Diamond Port. 2036 jaw. Heavy tandem.
Ama. West. 28x40 Prim. Crusher, 100 HP Elec.
motor. Complete.

C-B 2A-GR Port. 2236 jaw Diesel.
C-B 20" x 45" double Impeller Breaker, feeder.
Universal 2042 jaw, 40x24 roll Diesel Port.

DREDGES

Poker 6'x3" port. hull 5'x24'x3' Diesel.
Morris 6" diesel on 14'x36" hull
Markham 12'x10" cutterhead Cat. 337 main power
Markham 12'x10" cutterhead Cummins 600 Diesel
Amaeo 14" suction 12" discharge heavy duty Type
307 Turbo charged Cat. engine.

RICHARD P. WALSH CO.

80 Church St. New York 7, N. Y.
CO 7-0723 Cable: RICHWALSH

COMPRESSORS: Two Ingersoll Rand XVHEZ,
capacity 2790 CFM @ 100 lbs. 500 H.P.,
2300 volts.

CLASSIFIER: Akins 78" x 26'9" with motors
and drive. New 1959

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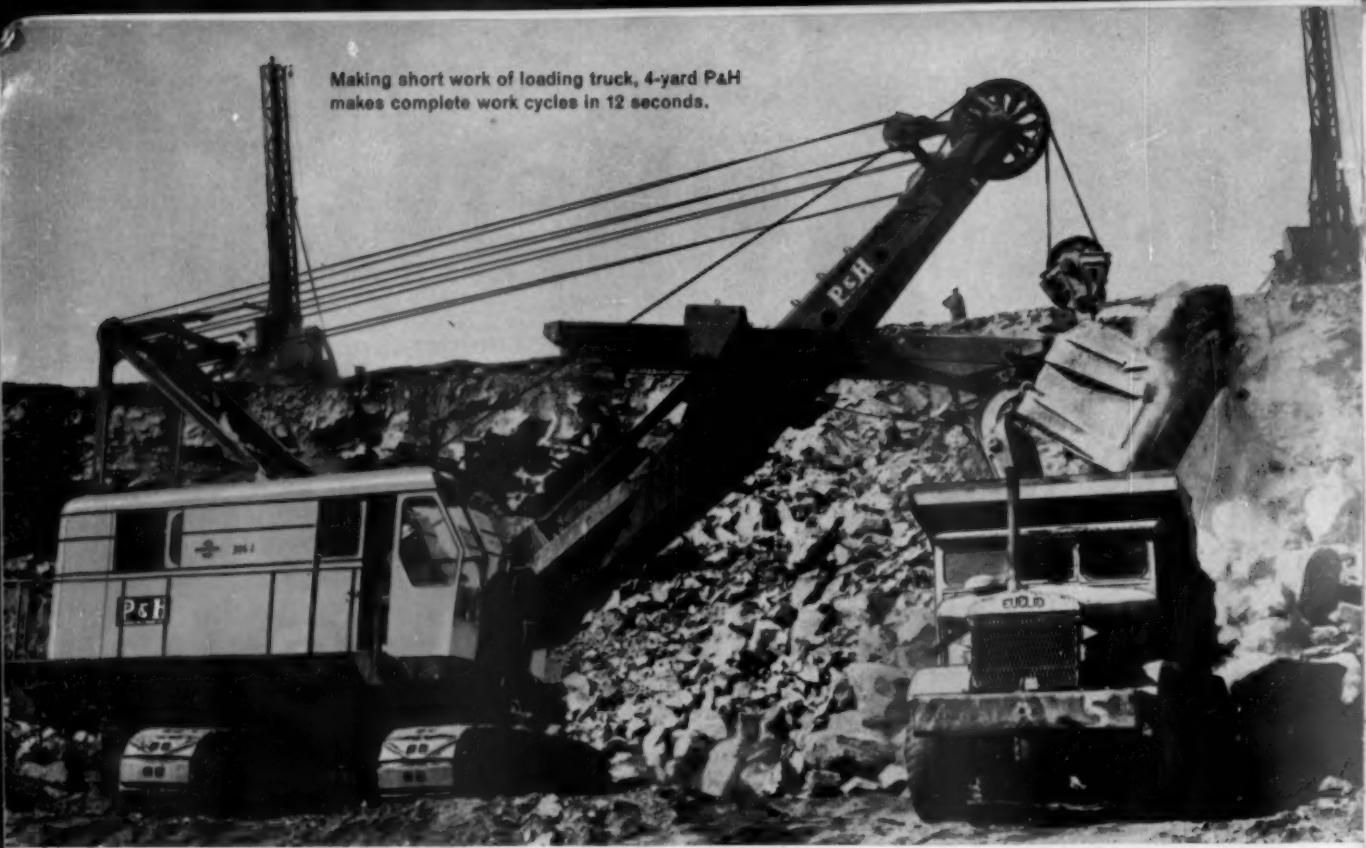
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